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Assessment Manager

# TRAFFIC IMPACT ASSESSMENT

Byculla Farm Expansion - Felton Road | Pittsworth

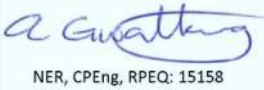
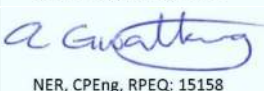
Traffic Engineering Report

Client Alpair Pty Ltd - McLean Farms

Project Number 23E-0384

## REPORT CONTROL SHEET

| Report Details |                                                                               |
|----------------|-------------------------------------------------------------------------------|
| Report Title:  | Traffic Impact Assessment – Byculla Farm Expansion - Felton Road   Pittsworth |
| Project No.:   | 23E-0384                                                                      |
| Site:          | 919 Clifton Pittsworth Road, North Branch (Lot 1745 on A34901)                |
| Author:        | Christian Tedman                                                              |

| Document Control |          |            |                    |                                                                                                                |                |
|------------------|----------|------------|--------------------|----------------------------------------------------------------------------------------------------------------|----------------|
| Revision         | Author   | Reviewer   | Approved for Issue |                                                                                                                |                |
|                  |          |            | Name               | Signature                                                                                                      | Date           |
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## 1. Introduction

RMA Engineers has been engaged by Alpair Pty Ltd to undertake a Traffic Impact Assessment (TIA) in support of a development application for a proposed poultry rearing farm expansion located on the corner of Clifton Road and Byculla Road, North Branch (the subject site). The proposed development site is identified as Lot 1745 on A34901 within the Toowoomba Regional Council (TRC) area.

The proposed development consists of a rearing farm to be constructed on the subject site, which will comprise of five (5) pods (two sheds per pod) and ancillary facilities. Access to the subject site is via an existing access located at the end of Byculla Road.

This report has been prepared in support of the development application for the proposed poultry farm development to be lodged with TRC. This report considers the traffic impacts of the expansion and the ultimate scenario.

This traffic impact assessment has been undertaken in general accordance with the road transport related requirements identified in the Department of Transport and Main Roads (DTMR) Guide to Traffic Impact Assessment (GTIA) (2018) and TRC Planning Scheme.

### 1.1 Report objectives and scope

The purpose of this traffic impact assessment (TIA) is to document an investigation of traffic and transport impacts of the proposed development on the surrounding road network. The assessment considers the following:

- Estimation of traffic generation by the development and distribution on the surrounding road network.
- Review of potential operational impacts at the key intersections with the proposed development influence at the year of completion.
- Review of key intersection layouts and turn warrants.
- Review of pavement impacts on state-controlled road network.
- Assessment of sight distance at key intersections in accordance with Australian Standards.
- Review of the proposed development layout against relevant standards and Council planning scheme requirements.
- Safety considerations, review of historical crash data and commentary on required mitigation measures.
- Vehicle swept paths and manoeuvrability assessment at proposed access location and key intersections.

Where required, this report makes recommendations for the mitigation of development impacts.

## 1.2 Reference material

In preparing this report, reference has been made to the following:

- Austroads Guide to Road Design, Part 4A: *Unsignalised and Signalised Intersections* (2023)
- DTMR *Guide to Traffic Impact Assessment* (GTIA) (2018)
- DTMR *Road Planning and Design Manual* (RPDM) (2021)
- TRC *Planning Scheme* - Version 28 (2022)

## 2. Proposed development

### 2.1 Location and descriptions

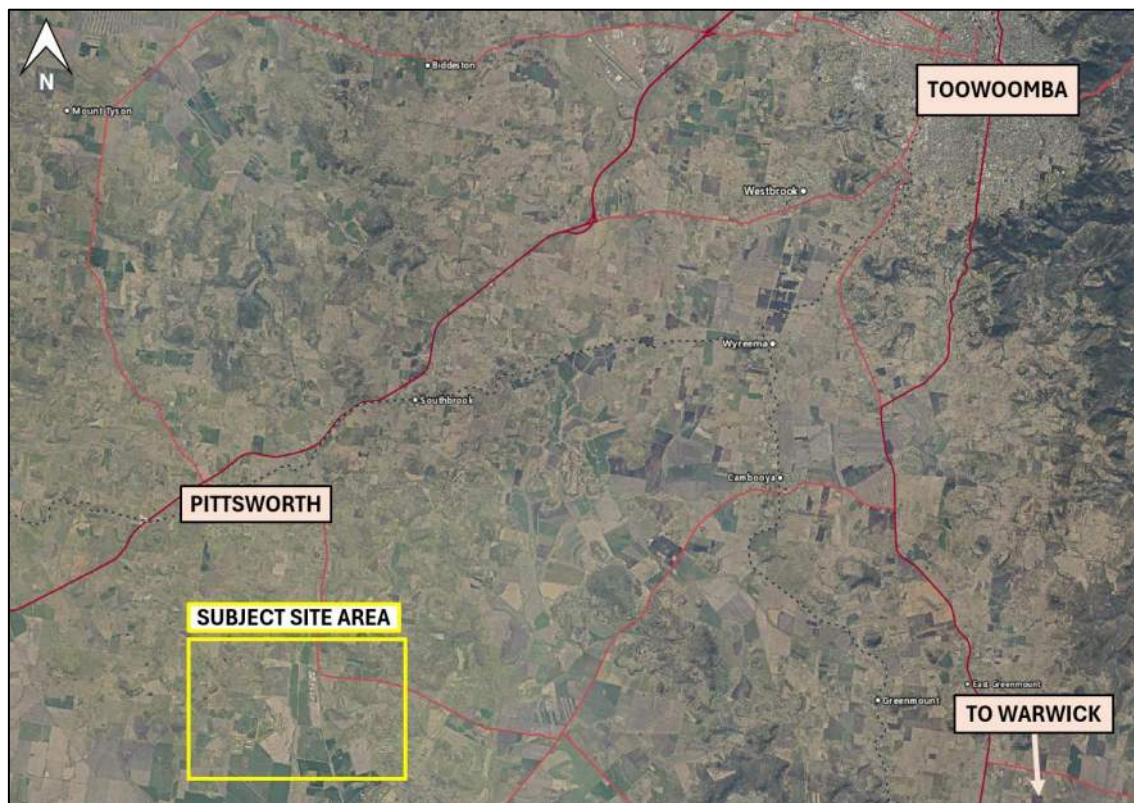
The subject site is located on the corner of Clifton Road and Byculla Road, North Branch. The development is located within the Toowoomba Regional Council (TRC) local government area, approximately 9 km south of Pittsworth. The site is described as Lot 1745 on A34901 and comprises an area of approximately 81 ha.

Clifton Road borders the site in the west, and Byculla Road borders the site in the north. Existing rearing facilities are located to the immediate south of the site. The site is surrounded by rural land uses as per TRC Planning Scheme.

Access to the subject site is proposed via the existing access on Byculla Road. This access operates in a way that only one vehicle can enter or exit the site at any one time.

The subject site currently consists of an existing property and is zoned as rural in the TRC Planning Scheme.

The site and its environs are illustrated on the locality plans in **Figure 2-1** and **Figure 2-2**.



**Figure 2-1: Locality plan**

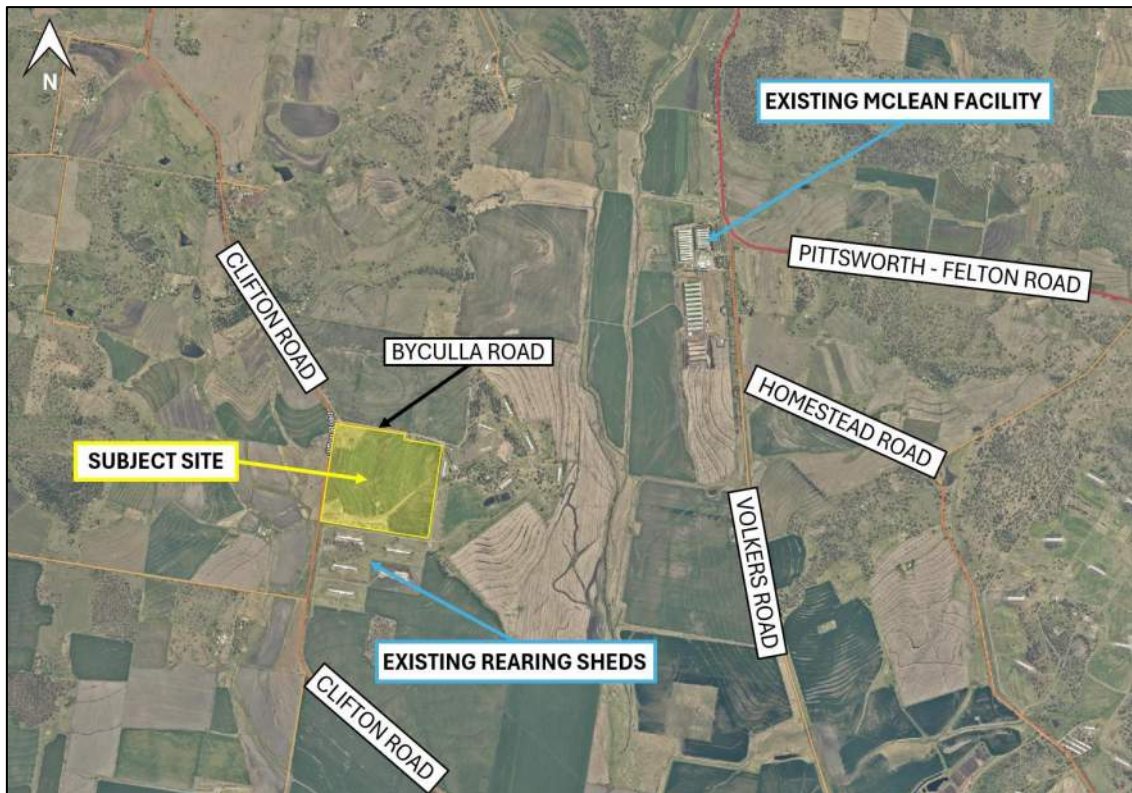


Figure 2-2: Inset of locality plan

## 2.2 Development details

The proposed development involves the expansion of poultry rearing farm facilities within the existing boundaries of Byculla. The proposed expansion consists of five pods (two sheds per pod) and associated ancillary facilities (site amenities). At full production, each pod will house up to 80,000 birds (i.e., total production capacity of 400,000 birds per batch).

The development will operate between the hours of 6am and 6pm, seven days a week. Relevant operational details of the proposed rearing farm are discussed below.

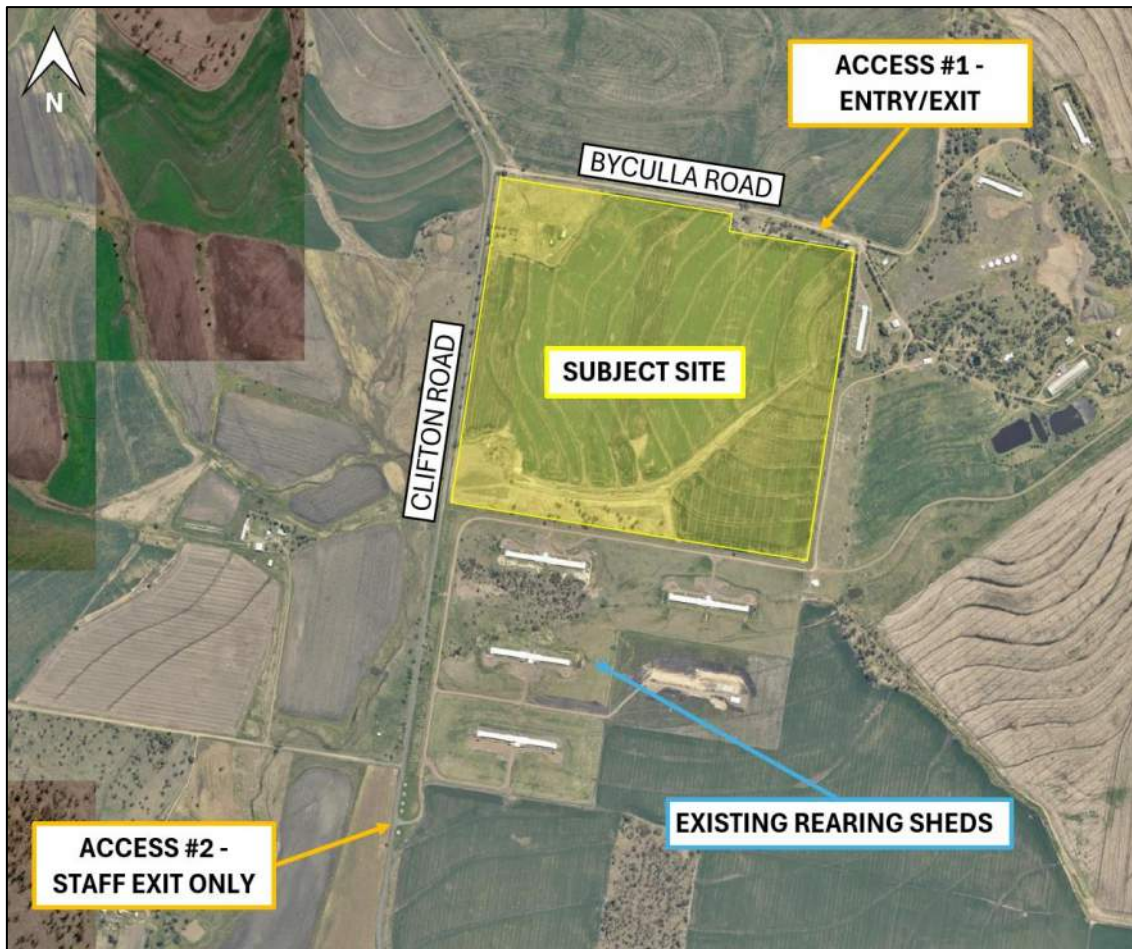
Refer to **Appendix A** for the layout of the proposed farm.

### 2.2.1 Site access

The subject site gains access to/from the external road network via two existing access locations:

- Access #1: Byculla Road (entry/exit) – all vehicle types
- Access #2: Clifton Road (exit only) – staff (light) vehicles only

The location of both access locations is shown in **Figure 2-3**. It is noted that Access #2 is located south of the subject site itself, however still within the greater McLeans facility, and can be accessed via the existing internal road network as illustrated in **Figure 2-3**.



**Figure 2-3: Site access locations**

### 2.2.2 Staging

Staging details of the expansion has been provided by the client and is as follows:

- Stage 1 (2025): Pod 1 (i.e., two sheds)
- Stage 2 (2026): Pod 2 (i.e., two sheds)
- Stage 3 (2027): Pod 3 (i.e., two sheds)
- Stage 4 (2028): Pod 4 (i.e., two sheds)
- Stage 5 (2029): Pod 5 (i.e., two sheds)

As indicated above, the development proposes to construct an additional pod (two sheds) every year until 2029 (ultimate completion), totalling five pods (10 sheds).

It is noted that this report only considers the ultimate development scenario (i.e. all stages fully operational), as this will provide the worst-case impact for the traffic assessment.

### 2.2.3 Operational details

Chicks are brought onto the farm at 20-22 weeks of age over a two-week period in two placements. The birds will be reared in the facility for 40-44 weeks (20 weeks on-site) and will then be removed from the farm to a processing facility (all-in, all-out operation). After removing the adult birds, the pods will be cleaned and sanitised, general maintenance and repair undertaken, before the introduction of new birds.

Delivery and collection of birds for each shed will be staggered, as birds will be placed over a two-week period.

Other activities associated with the site will include weekly feed delivery and manure collection / export.

A 16-space staff carpark and separate amenities block will make up part of the development which will be located on the eastern side of the pods.

One farm manager will live on-site in an existing dwelling.

#### **2.2.4 Expected traffic movements and design vehicles**

The proposed operational activities on site will generate minimal vehicle movements on the external road network. It is expected that peak hour vehicle movements generated by the development site will be predominantly associated with staff. Details regarding the vehicle movements associated with the development are provided below.

##### ***Staff***

A total of 12 additional full time staff (including contractors) will be employed to carry out the site operations seven days a week. The staff travelling to and from the site will arrive for their shift no later than 6am and leave the site when their shift ends, at approximately 6pm.

It is understood that all staff members will travel to and from Pittsworth in private (light) vehicles, with 2 staff per vehicle. It is noted that staff may travel to other areas within the region however for the purpose of this assessment, all staff will travel to and from Pittsworth accessing the site via the existing access on Byculla Road and exiting the site via Byculla Road or Clifton Road. This provides a conservative 'worst-case' impact scenario of the development on the surrounding road network.

##### ***Deliveries***

The deliveries to and from the site are expected to involve the following operational activities and associated vehicle movements:

- Chicken delivery: One semi trailer will deliver birds to the development site once per fortnight (i.e. approximately 26 loads per year). The semi-trailers will travel from Bendigo, Victoria to Pittsworth, and then to the site via Clifton Road and Byculla Road. These deliveries are expected to occur on any given time and day between 8am to 12pm from Monday to Friday. The delivery can be arranged so that it doesn't coincide with any other deliveries or collections occurring on the site.
- Chicken collection: Semi-trailers will collect chickens from the development site 2.7 times per year over a 4-day period (4 loads per day), totalling 43 loads per year. 28 loads will leave the site via Byculla Road (and Clifton Road) while the remaining 15 loads will be transferred to Hopevale via Homestead Road. Collections are expected to occur at any given time. Collections can be arranged so that it doesn't coincide with any other deliveries or collections occurring on the site.
- Feed delivery: A semi-trailer will deliver feed to the development site four times per week. The semi-trailer will travel from Pittsworth via Clifton Road and Byculla Road. These deliveries are expected to occur at any given time (days vary). The delivery can be arranged so that it doesn't coincide with any other deliveries or collections occurring on the site.

- Manure: A semi-trailer will export manure from the site five times per week. The semi-trailer will travel from Pittsworth via Clifton Road and Byculga Road, and to Organic Nutrients which is located south east of the site on Homestead Road. Exports are expected to occur at any given time (days vary) and can be arranged so that it doesn't coincide with any other deliveries or collections occurring on the site.

**Table 2-1** and **Table 2-2** provide a summary of the anticipated daily development traffic volumes based on the operational details above.

**Table 2-1: Anticipated development vehicle movements (staff)**

| Stage                                 | Trip type                   | Arrival time          | Departure time | Day(s)                      | No. of Staff                                                         | Origin / Destination                      | Traffic Generation                             | Average development traffic generation (ultimate scenario) |                                                    |                                                   |
|---------------------------------------|-----------------------------|-----------------------|----------------|-----------------------------|----------------------------------------------------------------------|-------------------------------------------|------------------------------------------------|------------------------------------------------------------|----------------------------------------------------|---------------------------------------------------|
|                                       |                             |                       |                |                             |                                                                      |                                           |                                                | Estimated annual traffic generation (no. vehicles)         | Estimated weekly traffic generation (no. vehicles) | Estimated daily traffic generation (no. vehicles) |
| Existing rearing facilities           | Poultry staff               | 6:00am                | 6:00pm         | Every day (7 days per week) | 14 staff including on-site staff and off-site contractors            | Pittsworth (via Clifton and Byculla Road) | 11 vehicles per day, 7 days per week           | 4,004                                                      | 77                                                 | 11                                                |
|                                       | Poultry service contractors | Varies throughout day |                |                             |                                                                      |                                           |                                                |                                                            |                                                    |                                                   |
|                                       | Other contractors           |                       |                |                             |                                                                      |                                           |                                                |                                                            |                                                    |                                                   |
| Proposed expansion (2029)             | Poultry staff               | 6:00am                | 6:00pm         | Every day (7 days per week) | 12 additional staff including on-site staff and off-site contractors | Pittsworth (via Clifton and Byculla Road) | 6 additional vehicles per day, 7 days per week | 2,184                                                      | 42                                                 | 6                                                 |
|                                       | Poultry service contractors | Varies throughout day |                |                             |                                                                      |                                           |                                                |                                                            |                                                    |                                                   |
|                                       | Other contractors           |                       |                |                             |                                                                      |                                           |                                                |                                                            |                                                    |                                                   |
| Ultimate – existing + proposed (2029) |                             |                       |                |                             | 26 total staff                                                       | Pittsworth (via Clifton and Byculla Road) | 17 vehicles total, 7 days per week             | 6,188                                                      | 119                                                | 17                                                |

Table 2-2: Anticipated development vehicle movements (deliveries and collections)

| Stage                                 | Trip type          | Arrival time         | Departure time       | Vehicle Type     | Day(s)             | Origin / Destination                                                        | Traffic Generation                                                                                                                                                                            | Average development traffic generation (ultimate scenario) |                                                    |                                                   |
|---------------------------------------|--------------------|----------------------|----------------------|------------------|--------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------|---------------------------------------------------|
|                                       |                    |                      |                      |                  |                    |                                                                             |                                                                                                                                                                                               | Estimated annual traffic generation (no. vehicles)         | Estimated weekly traffic generation (no. vehicles) | Estimated daily traffic generation (no. vehicles) |
| Existing rearing facilities           | Chicken delivery   | 8am to 12pm (varies) | 8am to 12pm (varies) | 19m semi trailer | Mon - Fri (varies) | Bendigo, Victoria via Byculla Road and Clifton Road                         | 1 vehicle every fortnight throughout the year<br><i>Note: All below truck movements will staged throughout the day i.e. all two truck movements will not occur within the same peak hour.</i> | 26                                                         | 0.5                                                | 0.1                                               |
|                                       | Chicken collection | 8am to 3pm (varies)  | 8am to 3pm (varies)  | 19m semi trailer | Mon - Fri (varies) | Pittsworth via Byculla Road and Hopevale (existing site) via Homestead Road | 4 vehicles per day, over 4 days, 23 times per year<br><i>Note: 240 loads will leave the site via Byculla Road, and 128 will leave via Homestead Road.</i>                                     | 368                                                        | 7                                                  | 1.4                                               |
|                                       | Feed delivery      | 8am to 3pm (varies)  | 8am to 3pm (varies)  | 19m semi trailer | Mon - Fri (varies) | Pittsworth (via Byculla Road and Clifton Road)                              | 8 vehicles per week throughout the year                                                                                                                                                       | 415                                                        | 8                                                  | 1.6                                               |
|                                       | Manure collection  | 8am to 3pm (varies)  | 8am to 3pm (varies)  | 19m semi trailer | Mon-Fri (varies)   | Organic Nutrients (via Homestead Road)                                      | 10 vehicles per week throughout the year                                                                                                                                                      | 520                                                        | 10                                                 | 2                                                 |
| Total – existing                      |                    |                      |                      |                  |                    |                                                                             |                                                                                                                                                                                               | 1,329                                                      | 25.5                                               | 5.1                                               |
| Proposed expansion (2029)             | Chicken delivery   | 8am to 12pm (varies) | 8am to 12pm (varies) | 19m semi trailer | Mon - Fri (varies) | Bendigo, Victoria via Byculla Road and Clifton Road                         | 1 vehicle every fortnight throughout the year                                                                                                                                                 | 26                                                         | 0.5                                                | 0.1                                               |
|                                       | Chicken collection | 8am to 3pm (varies)  | 8am to 3pm (varies)  | 19m semi trailer | Mon - Fri (varies) | Pittsworth via Byculla Road and Hopevale (existing site) via Homestead Road | 4 vehicles per day, over 4 days, 2.7 times per year<br><i>Note: 28 loads will leave the site via Byculla Road, and 15 will leave via Homestead Road.</i>                                      | 43                                                         | 0.8                                                | 0.2                                               |
|                                       | Feed delivery      | 8am to 3pm (varies)  | 8am to 3pm (varies)  | 19m semi trailer | Mon - Fri (varies) | Pittsworth (via Byculla Road and Clifton Road)                              | 4 vehicles per week throughout the year                                                                                                                                                       | 208                                                        | 4                                                  | 0.8                                               |
|                                       | Manure collection  | 8am to 3pm (varies)  | 8am to 3pm (varies)  | 19m semi trailer | Mon-Fri (varies)   | Organic Nutrients (via Homestead Road)                                      | 5 vehicles per week throughout the year                                                                                                                                                       | 260                                                        | 5                                                  | 1                                                 |
| Total - proposed                      |                    |                      |                      |                  |                    |                                                                             |                                                                                                                                                                                               | 537                                                        | 10.3                                               | 2.1                                               |
| Ultimate – existing + proposed (2029) |                    |                      |                      |                  |                    |                                                                             |                                                                                                                                                                                               | 1,866                                                      | 35.8                                               | 7.2                                               |

From **Table 2-1** and **Table 2-2**, it is identified that the proposed expansion will generate relatively low daily traffic volumes, consisting of an average of two heavy vehicles and six light vehicles per day. This equates to a combined average of eight vehicles per day.

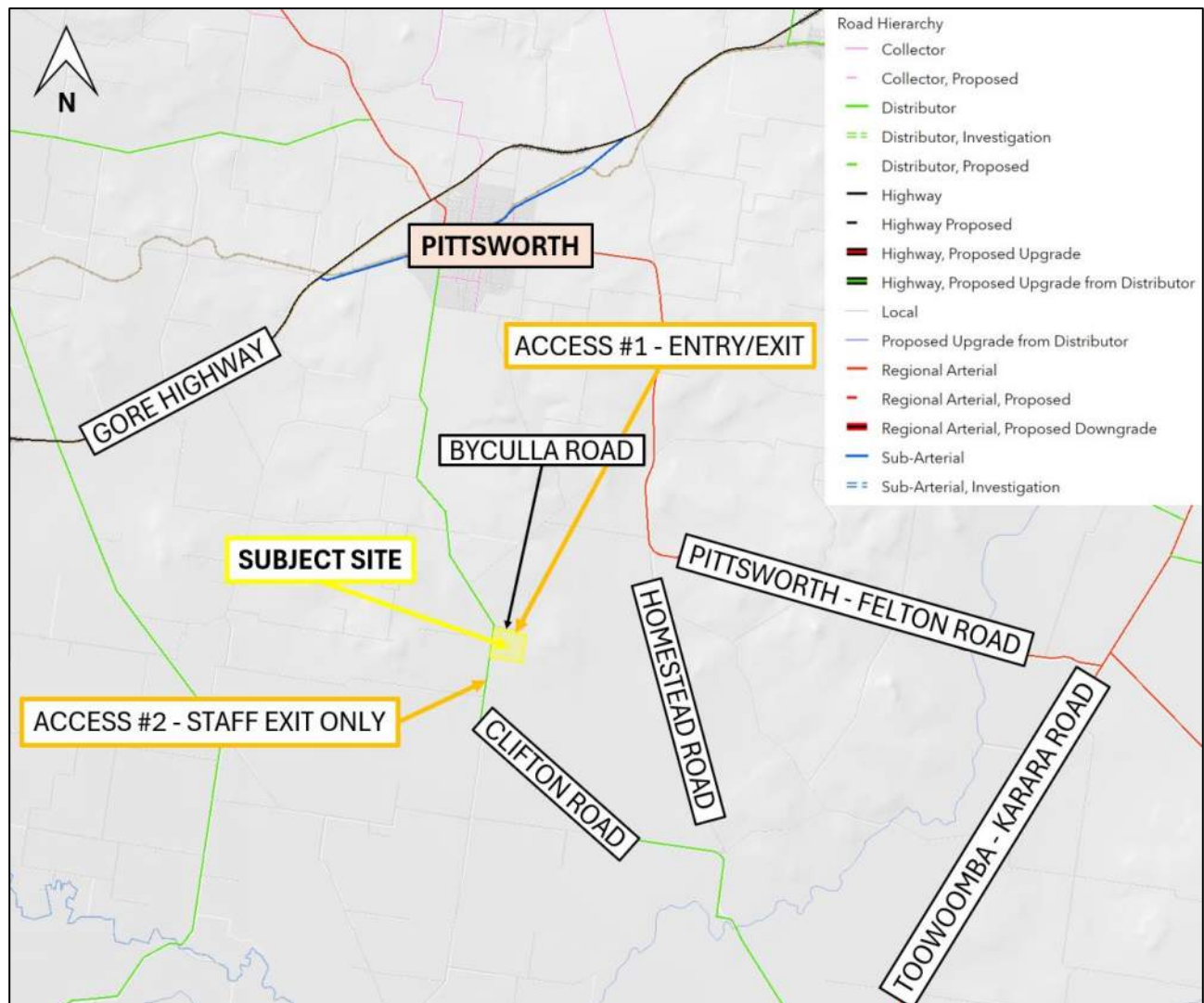
It is noted that the maximum number of vehicles to enter and exit the development site per hour are six vehicles in the development AM peak and six vehicles in the development PM peak (associated with additional staff vehicle movements). Contractors associated with the site are expected to arrive and depart throughout the day at varying times.

### 3. Existing transport environment

#### 3.1 Surrounding road network

The principal traffic route providing access to the subject site is via Clifton Road and Byculla Road. As stated in **Section 2.2.3**, development vehicles will also use Homestead Road to export manure to Organic Nutrients.

The relevant TRC hierarchy surrounding the development is shown in **Figure 3-1**.



**Figure 3-1: TRC road hierarchy**

The key roads and intersections are discussed further in the following sections.

## 3.2 Key roads

### 3.2.1 Clifton Road

Clifton Road is classified as a distributor road under the jurisdiction of TRC. The road runs predominantly north-south and extends from Pittsworth in the north, to Clifton Pittsworth Road in the south (approximately 20km in length).

Clifton Road has the following characteristics in the vicinity of the subject site:

- Two-way, two lane configuration with centre line marking
- Sealed carriageway width of approximately 8m
- 4m wide lanes
- Road reserve width of 20m
- Posted speed limit of 100km/h

The general form of Clifton Road in the vicinity of the subject site is shown below in **Figure 3-2**.



**Figure 3-2: Clifton Road (looking north)**

### 3.2.2 Byculla Road

Byculla Road is classified as a local road under the jurisdiction of TRC. The road runs east-west from the intersection with Clifton Road to the site entrance.

Byculla Road has the following characteristics in the vicinity of the subject site:

- Two-way, two lane configuration with no line marking
- Unsealed carriageway width of approximately 5m
- Traversable grassed shoulders

- Road reserve width of approximately 17m
- No posted speed limit (rural default speed limit of 100km/h)

The general form of Byculla Road in the vicinity of the subject site is shown below in **Figure 3-3**.



**Figure 3-3: Byculla Road (facing east)**

### **3.2.3 Homestead Road**

Homestead Road is classified as a local road under the jurisdiction of TRC. The road runs predominantly north-west / south-east and extends from Pittsworth – Felton Road in the north, to the Hodgson Creek where the road changes to Tyson Road (approximately 9km in length).

Homestead Road has the following characteristics in the vicinity of the subject site:

- Two-way, two lane configuration
- Sealed carriageway width varying between approximately 3.5m to 5.5m for 2.5km, then unsealed (width of approximately 5m)
- Traversable gravel shoulders varying in width (1m – 2m)
- Road reserve width of 100m along frontage of existing Mclean facility, then a width of 30m south-east of Volkers Road
- No posted speed limit (rural default speed limit of 100km/h)

The general form of Homestead Road in the vicinity of the subject site is shown below in **Figure 3-4**.



**Figure 3-4: Homestead Road (looking south)**

### **3.3 Key intersections**

The Clifton Road / Byculla Road and Clifton Road / Site Access #2 intersections are identified as the key intersections for this assessment.

It is noted that there are other intersections further from the site that may be utilised by development traffic, however, due to the location and expected distribution of development traffic, the Clifton Road / Byculla Road and Clifton Road / Site Access #2 intersections are the only intersections where the expected impact of the development is considered of significance (i.e. development traffic being more than five per cent of the background traffic).

The following sections describe these key intersections in further detail.

#### **3.3.1 Clifton Road / Byculla Road**

The existing form of the Clifton Road / Byculla Road intersection is a priority controlled T-intersection with a short auxiliary left turn lane (AUL(s)) from the northern Clifton Road approach, as shown below in **Figure 3-5**. The Byculla Road leg is sealed for approximately 25m from the intersection.



Figure 3-5: Clifton Road / Byculla Road priority controlled T-intersection

### 3.3.2 Clifton Road / Site Access #2 (staff exit only)

The existing formation of the Clifton Road / Site Access intersection is an uncontrolled T-intersection, catering for all movements with no dedicated turn lanes, as shown below in **Figure 3-6**.



**Figure 3-6: Clifton Road / Site Access #2 priority controlled T-intersection**

### 3.4 Crash data

Queensland Government crash data was reviewed for the most recent five-year period (1 January 2019 – 1 January 2024). Data was obtained from *Queensland Globe (transportation – road crash locations)*.

Findings indicate that there are two recorded crashes in the vicinity of the site. Both crashes were single vehicle crashes that occurred along Pittsworth – Felton Road, east of the subject site.

The approximate location of these crashes is shown below in **Figure 3-7** and further details are summarised in **Table 3-1**.

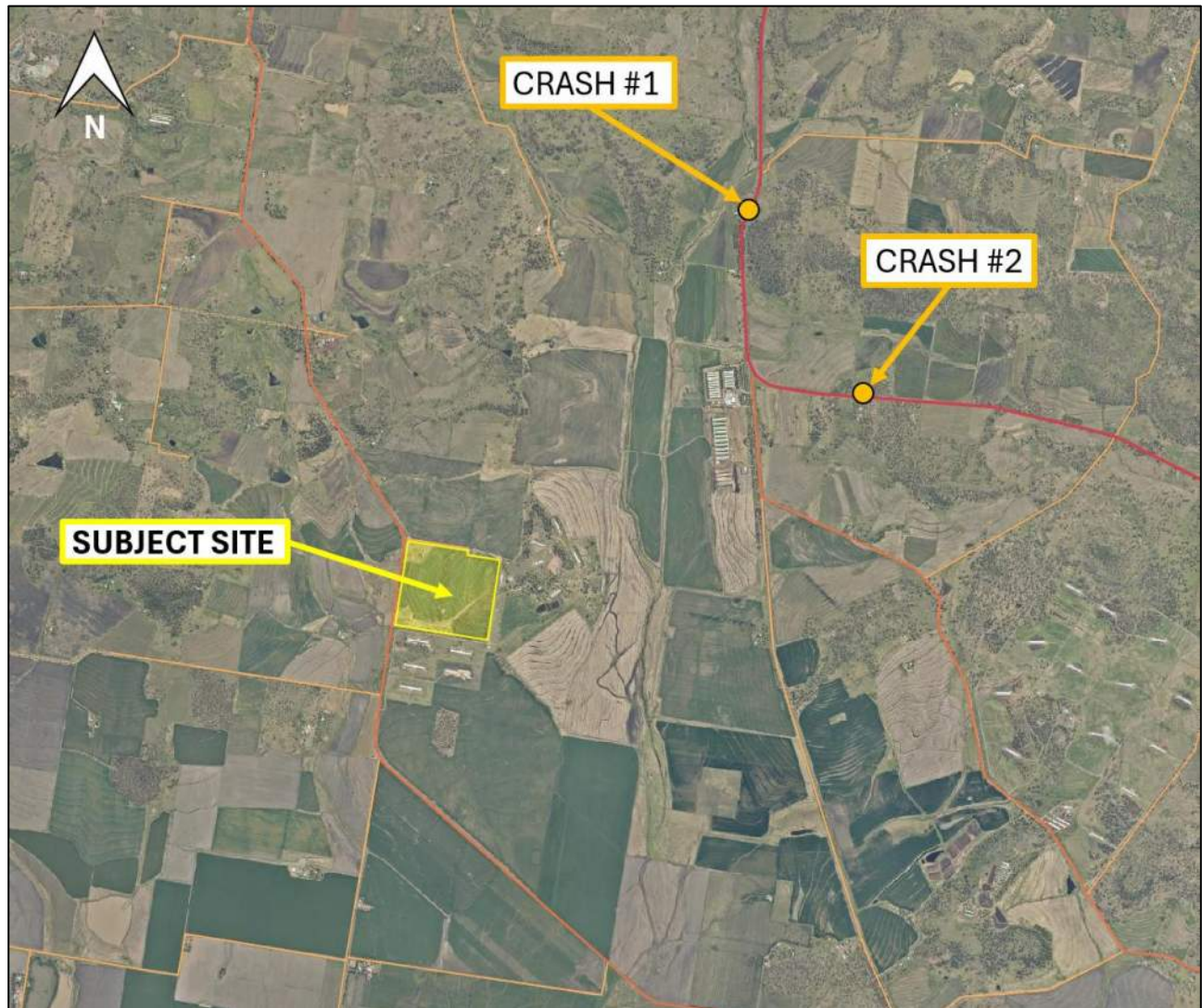


Figure 3-7: Road crash locations (obtained from Queensland Globe)

Table 3-1: Crash data

| No.                      | Crash year | Severity          | DCA code | DCA description                          | Atmospheric condition |
|--------------------------|------------|-------------------|----------|------------------------------------------|-----------------------|
| Pittsworth – Felton Road |            |                   |          |                                          |                       |
| 1                        | 2021       | Hospitalisation   | 803      | Off Path-Curve: Off Cway Rt Bend Hit Obj | Clear / Daylight      |
| 2                        | 2020       | Medical treatment | 703      | Off Path-Straight: Left Off Cway Hit Obj | Clear / Daylight      |

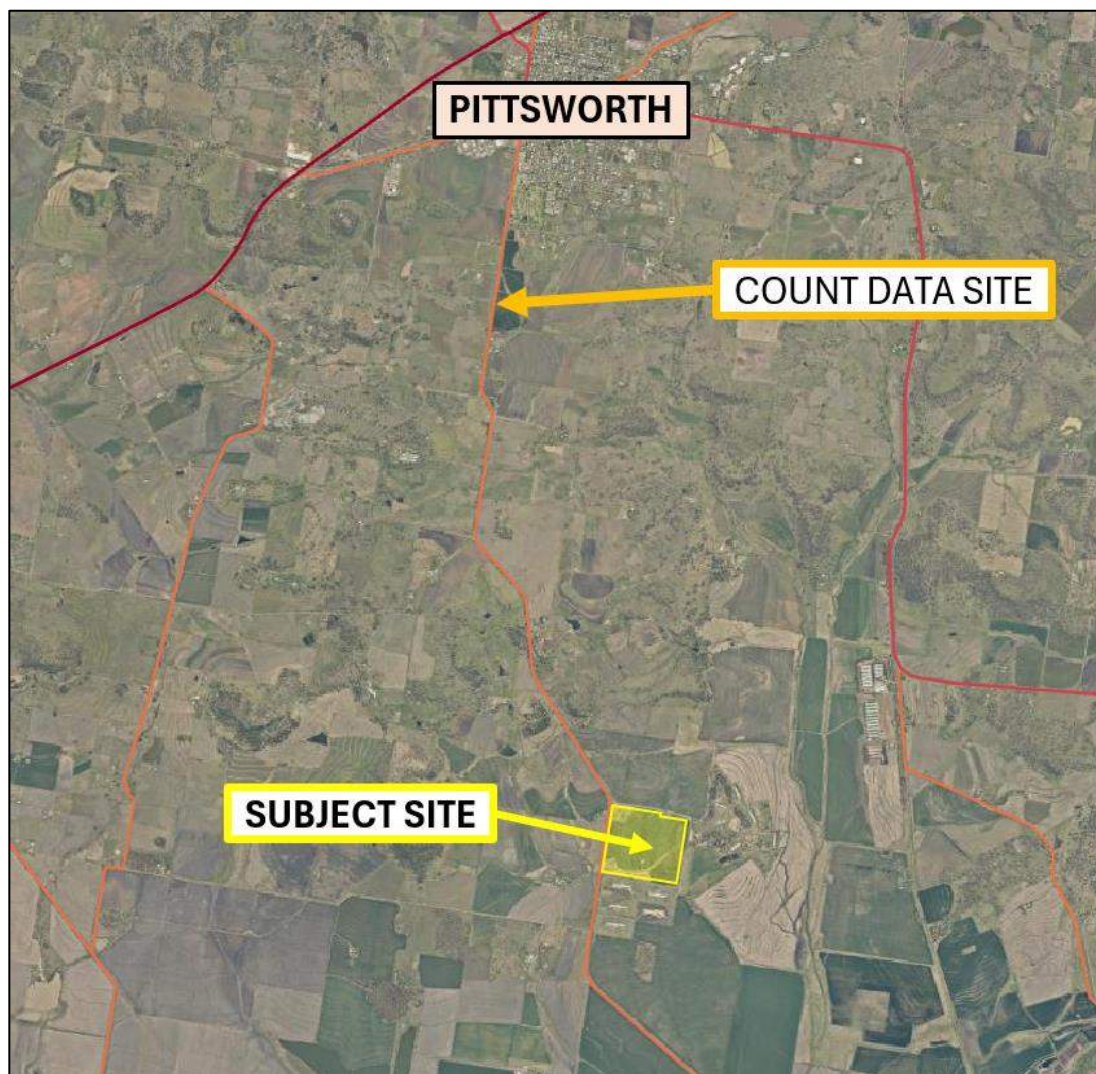
Given that there are only two reported incidents, with different DCA codes at different locations (and homogenous sections of the road), no safety issues, crash patterns or mitigation measures could be determined from the crash data review.

## 4. Traffic operation

### 4.1 Existing traffic volumes

#### 4.1.1 Clifton Road

Mid-block traffic survey data was collected on Clifton Road over a seven-day period (24 hours per day) in 2019, from Wednesday 9 October to Tuesday 15 October. Data was collected between Boundary Road and Jentz Road, approximately 6.5km north of Byculla Road, towards Pittsworth, as shown below in **Figure 4-1**.



**Figure 4-1: Clifton Road count data site location**

For a conservative assessment, the northbound and southbound traffic volumes at the above count data site have been applied to the Clifton Road / Byculla Road intersection and are shown in **Figure 4-2**. It should be noted that the volumes represent the average hourly volumes per weekday between 5:00am – 6:00am, and 6:00pm – 7:00pm, which corresponds to the subject site's peak hour (staff movements).

Traffic count data has been included in **Appendix B**.

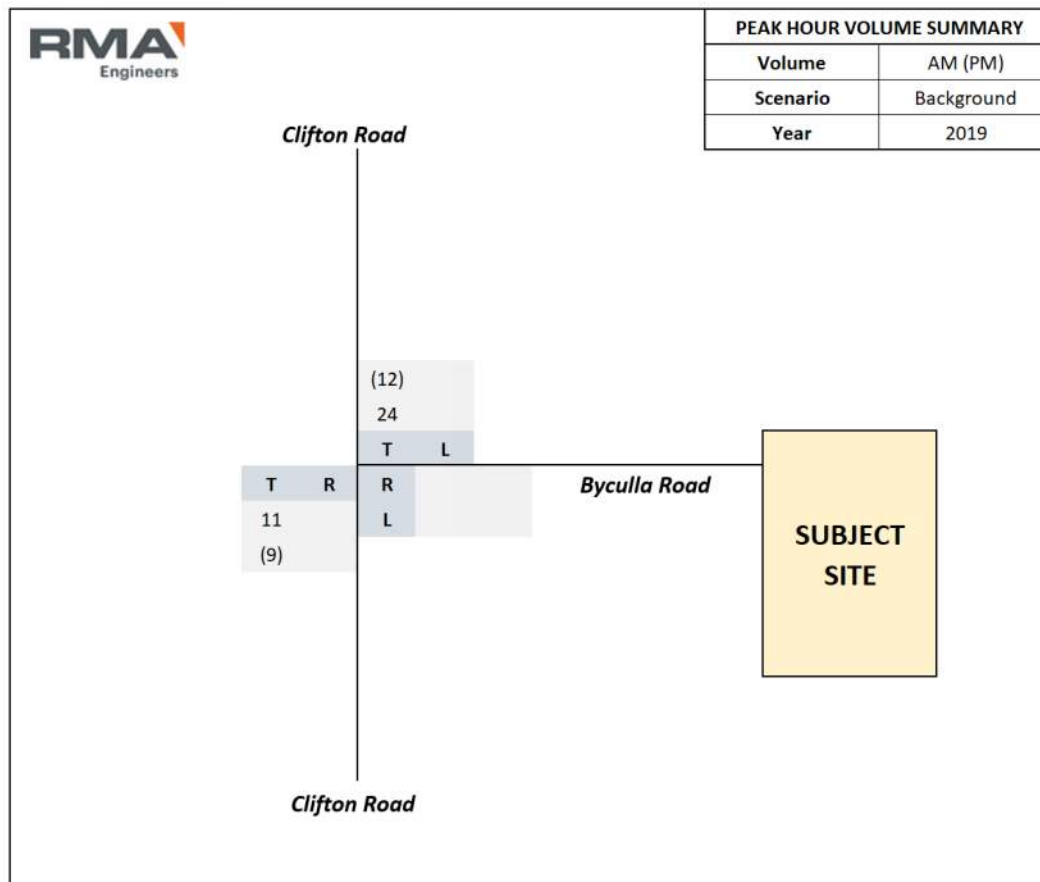


Figure 4-2: 2019 surveyed traffic

#### 4.1.2 Historical growth rate

Background traffic at the opening year was informed by the historical population growth rate of the Pittsworth area, obtained from the Australian Bureau of Statistics (ABS), and historical traffic data along Pittsworth-Felton Road.

Population data collected in 2016 and 2021 indicated an increase of 6 persons (0.04% per annum). Historical traffic data (DTMR site no. 32052) indicated a 5.6% (compound) per annum increase from 2013 to 2023. Combining both data sets, for a conservative assessment, a growth rate of 3% (compound per annum) has been adopted for this assessment.

From the above, the background traffic volumes for 2029 are shown below in **Figure 4-3**.

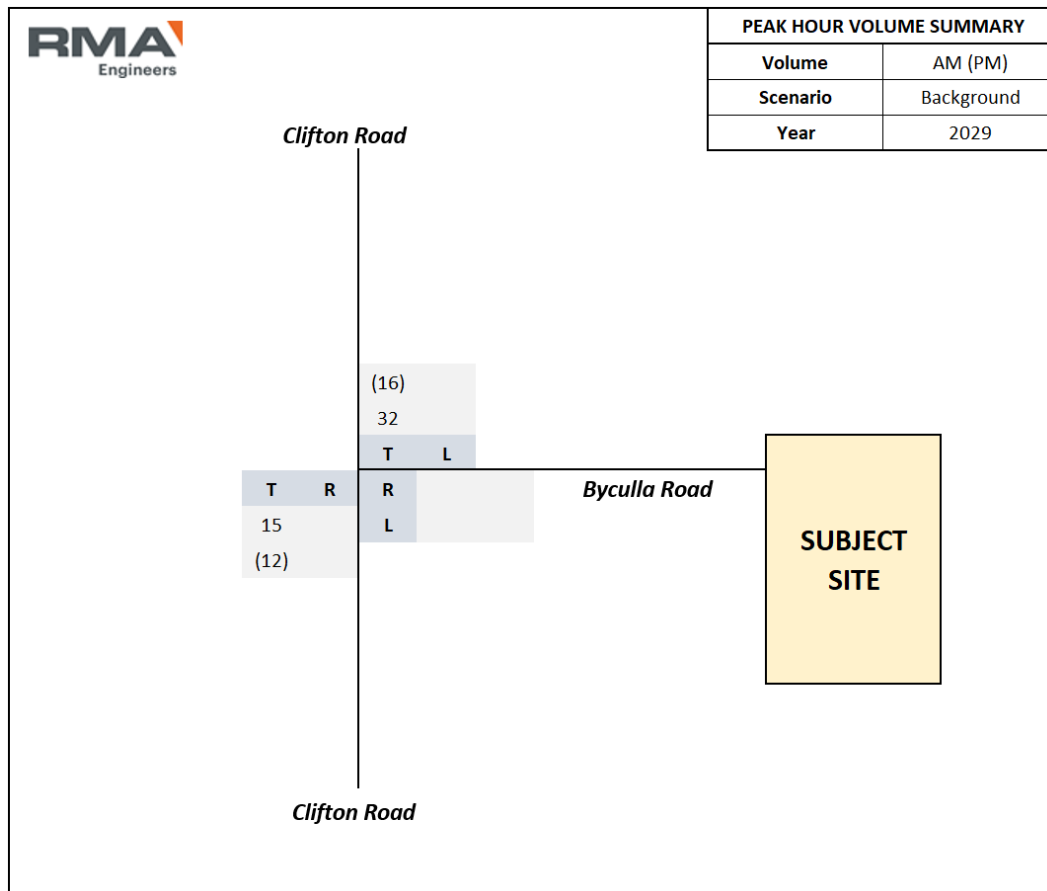


Figure 4-3: 2029 surveyed traffic (3% compound growth applied)

#### 4.1.3 Existing development traffic

As indicated previously in **Section 2.2.4**, the site currently generates 11 staff movements each day. For a conservative assessment, it is assumed that all staff travel to/from Pittsworth and enter the site between 5:00am – 6:00am and leave between 6:00pm – 7:00pm.

Applying the existing development traffic to the volumes shown above in **Figure 4-3** results in the 2029 'background' traffic scenario, which is illustrated in **Figure 4-4**.

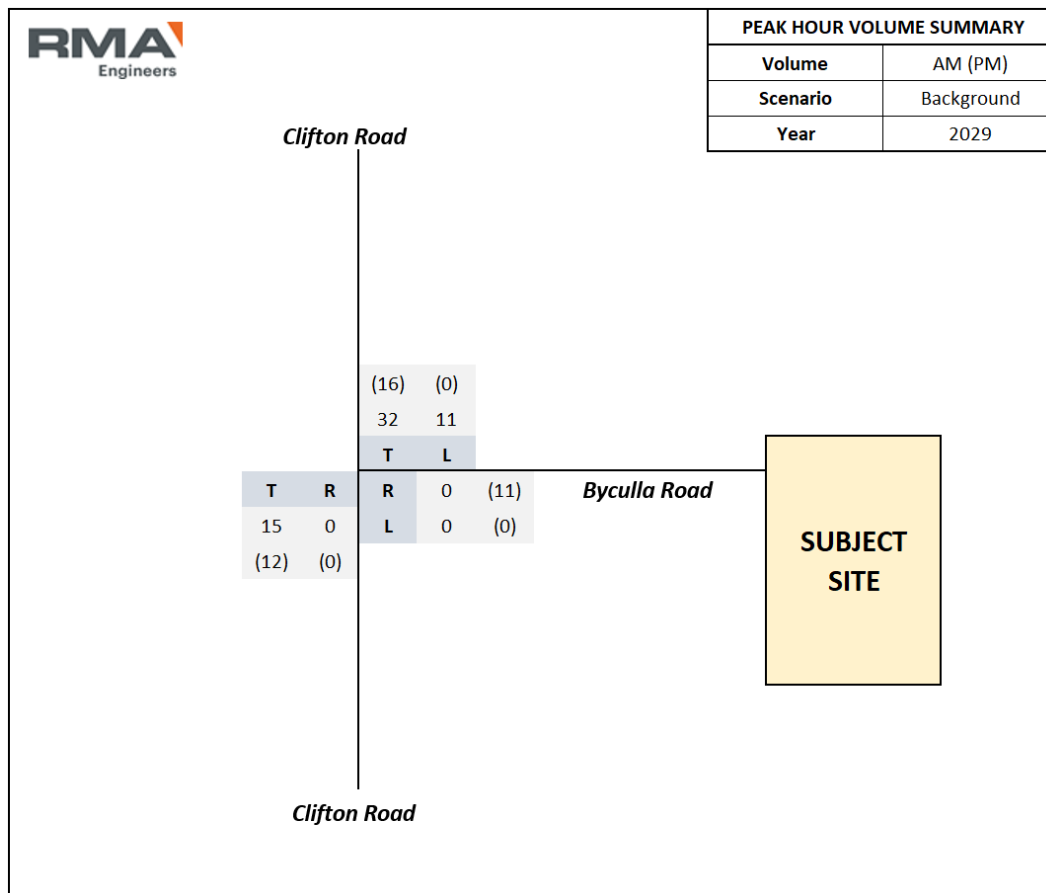


Figure 4-4: 2029 background traffic

## 4.2 Development traffic volumes

From the operational details (refer to **Section 2.2.4**), it is expected that peak hour vehicle movements generated by the development site will be predominantly associated with staff between 5:00am – 6:00am and 6:00pm – 7:00pm.

Based on this, the estimated development traffic volumes are shown in **Figure 4-5**, and the background with development traffic volumes are shown in **Figure 4-6**.

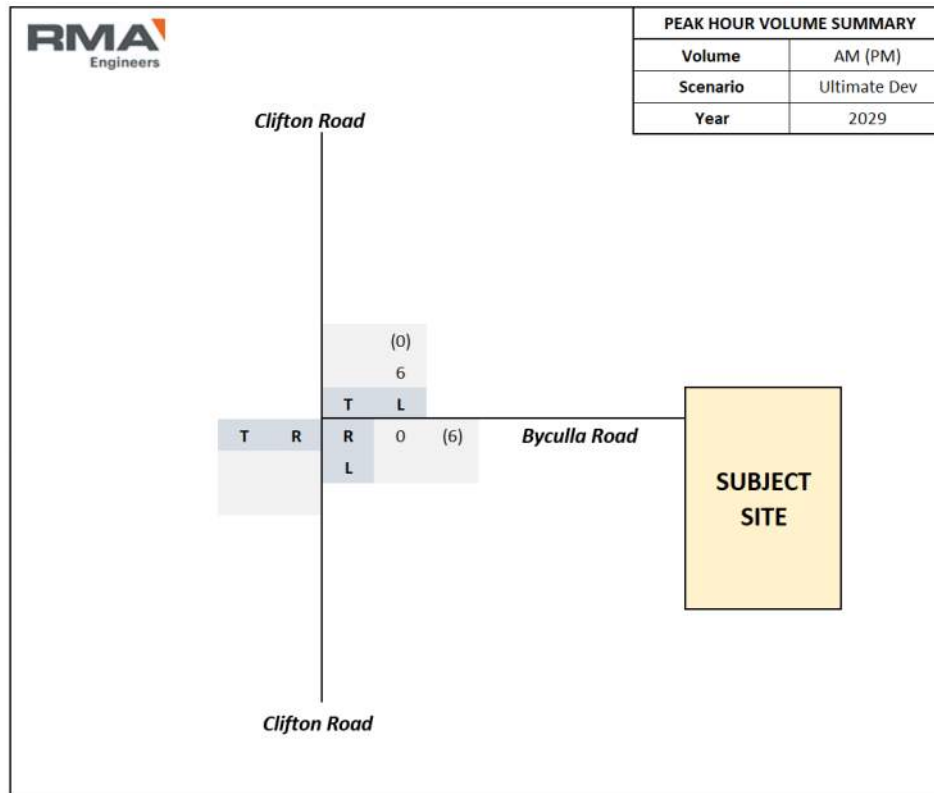


Figure 4-5: Development traffic (ultimate scenario)

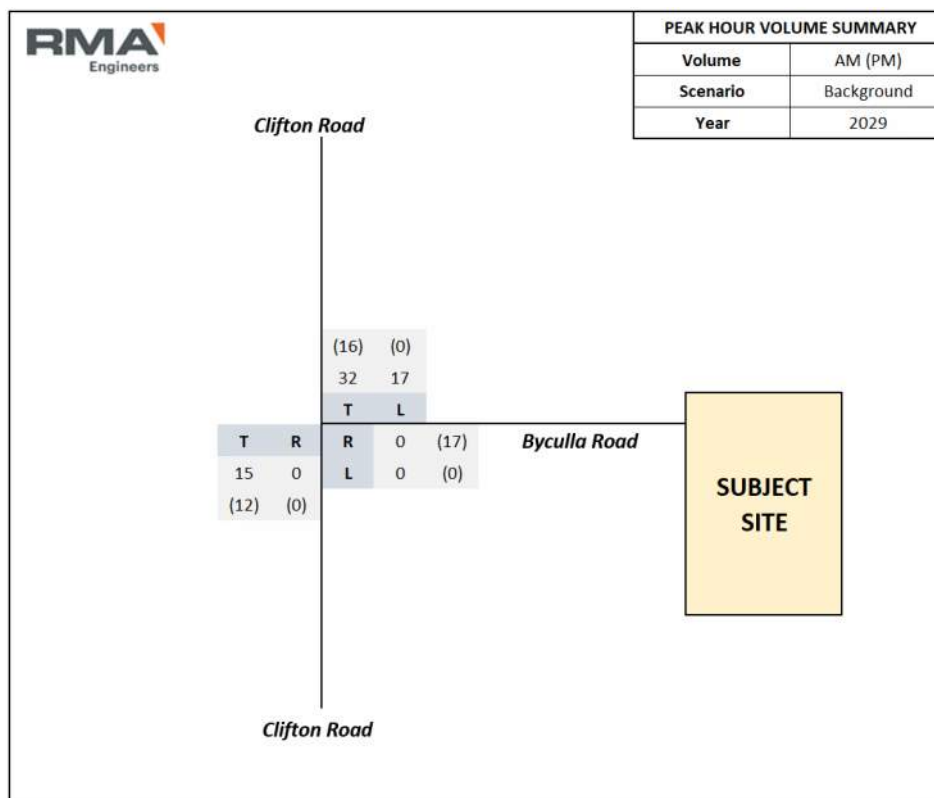


Figure 4-6: 2029 background and development traffic

### 4.3 Development traffic impact on external road network

The DTMR *Road Planning and Design Manual* Chapter 13.5.4 provides information relating to the maximum traffic volume combinations for uninterrupted traffic flow conditions. These combinations are shown in **Table 4-1** below and provide guidance for unsignalised intersections carrying light crossing and turning volumes. Where the volumes are less than that illustrated in **Table 4-1**, it is considered unnecessary to flare intersection approaches or carry out an intersection analysis.

**Table 4-1: Intersection capacity – uninterrupted flow conditions**

| Major road type <sup>1</sup> | Major road flow (vph) <sup>2</sup> | Minor road flow (vph) <sup>3</sup> |
|------------------------------|------------------------------------|------------------------------------|
| Two-lane                     | 400                                | 250                                |
|                              | 500                                | 200                                |
|                              | 650                                | 100                                |

*Major road is through i.e. has priority*

*Major road design volumes include through and turning movements*

*Minor road design volumes include through and turning volumes*

The anticipated background with development traffic volumes for the intersection of Clifton Road / Byculla Road (shown in **Figure 4-6**) do not exceed the hourly volume combinations shown in **Table 4-1**. Therefore, intersection analysis is not deemed warranted. It is expected that the key intersections will operate under practical capacity with the proposed development volumes.

## 5. Pavement impact assessment

As summarised in **Section 2.2.3**, expansion of the development will increase the number of heavy vehicles on the external road network by an average of approximately two heavy vehicles (four movements) per day. This increase is minimal and expected to have a negligible impact on the external road pavement. To further prove this, the GTIA PIA methodology was undertaken for the increase in development heavy vehicle traffic on Clifton Road.

The background SAR4s (ESAs) were calculated utilising heavy vehicle weekly volume reports, which are included in **Appendix B**. Using the GTIA methodology, the estimated annual number of background SAR4's along Clifton Road at the count data site, in each direction, for 2029 is shown in **Table 5-1**.

**Table 5-1: Clifton Road background SAR4s/ESAs for 2029**

| Road Name    | TDIST         | Direction  | Total AADT | HV AADT | SAR per HV | SAR per year |
|--------------|---------------|------------|------------|---------|------------|--------------|
| Clifton Road | 0.0km – 8.7km | Northbound | 324        | 42      | 3.2        | 57,057       |
|              |               | Southbound | 330        | 40      | 3.2        | 53,612       |

As previously summarised, heavy vehicle movements associated with the expansion of the rearing facilities comprise of semi-trailer vehicles (Class 9) which will access the development via Clifton Road. The loaded and unloaded SAR4s for the heavy vehicles associated with the development are detailed below:

- Semi-trailer (Class 9)
  - › Unloaded SAR4s = 0.51
  - › Loaded SAR4s = 4.93

From the above, **Table 5-2** summarises the development SAR4s, and **Table 5-3** details the impacts to Clifton Road.

**Table 5-2: Development traffic - SAR4s/ESAs**

| Trip               | Origin / Destination                    | Heavy Vehicle Split | Annual Unloaded SAR4s | Annual Loaded SAR4s | Annual Total SAR4s |
|--------------------|-----------------------------------------|---------------------|-----------------------|---------------------|--------------------|
| Chicken delivery   | 100% north                              | 100% Semi-trailer   | 274                   | 2,647               | 2,921              |
| Chicken collection | 100% north                              |                     |                       |                     |                    |
| Feed delivery      | 100% north                              |                     |                       |                     |                    |
| Manure collection  | 100% north<br>(conservative assumption) |                     |                       |                     |                    |

**Table 5-3: Clifton Road development SARs impact**

| Road Name    | TDIST         | Direction  | Background SARs per year | Development SARs per year | % impact |
|--------------|---------------|------------|--------------------------|---------------------------|----------|
| Clifton Road | 0.0km – 8.7km | Northbound | 57,057                   | 1,461                     | 2.6%     |
|              |               | Southbound | 53,612                   | 1,461                     | 2.7%     |

As indicated above, the heavy vehicle impact relating to the operation of the proposed expansion is not expected to have an adverse impact on the external road network pavement. This is because the net increase of SAR4s related to the development is less than 5.0% of the existing background SAR4s on the network.

Therefore, given the low number of development heavy vehicle movements (approximately two heavy vehicles per day increase), it can be determined that the development will not have any adverse pavement impacts on the Clifton Road and surrounding road network.

It is anticipated that the proposed development will also have a negligible impact on Byculla Road and Homestead Road (similar to the above outcome) due to the minimal increase in heavy vehicle movements (approximately two heavy vehicles per day increase), with the consideration of the existing low background traffic volumes.

From the above, no adverse pavement impacts are identified by the development traffic and no contributions are required by the developer.

## 6. Safety considerations

### 6.1 Turn warrant assessment

Turn warrants are used to identify the need to provide separate turning provisions from a functionality and safety perspective. The warrants are essentially the relationship between the turning volumes versus the major road traffic volumes.

In accordance with Austroads, turn warrants are based on the construction of new roads (i.e. greenfield sites) and is also used as a reference for intervention levels for updating existing intersection turn treatments. Turn warrant assessment is usually undertaken at these intersections to determine if protected turning lanes (i.e. channelisation) are required from a safety perspective.

Given the key intersections are considered brownfield sites with low volumes and existing constraints, a turn warrant assessment has been undertaken using the extended design domain (EDD) criteria.

The EDD warrants for turn treatments are detailed in the Supplement to Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (RPDM) published by DTMR.

#### 6.1.1 Clifton Road / Byculla Road

**Table 6-1** summarises the warrant treatments required at the Clifton Road / Byculla Road intersection. Detailed turn warrant graphs are provided in **Appendix C**.

**Table 6-1: Turn warrant summary**

| Scenario                                        | Peak | Right turn treatment triggered* | Left turn treatment triggered* |
|-------------------------------------------------|------|---------------------------------|--------------------------------|
| <b>Clifton Road / Byculla Road</b>              |      |                                 |                                |
| <b>2029 Background traffic</b>                  | AM   | SR                              | BAL                            |
| <b>2029 Background with development traffic</b> | PM   | SR                              | SL                             |
| <b>2029 Background</b>                          | AM   | SR                              | BAL                            |
| <b>2029 Background with development traffic</b> | PM   | SR                              | SL                             |

\* SR – Simple right turn (no treatment), BAL – Basic left turn, SL – Simple left turn (no treatment)

From the assessment, the turning movements at the intersection fall within simple right turn and basic left turn (BAL) thresholds.

It is noted that the intersection currently features a short auxiliary left turn lane (AUL(s)) and therefore, no further turn treatments or channelisation is triggered by the development.

#### 6.1.2 Clifton Road / Site Access #2

As summarised previously, the existing arrangement of Site Access #2 is a staff egress only and therefore no turn treatments on the major road (Clifton Road) are required.

## 6.2 Safe intersection sight distance assessment

Safe intersection sight distance (SISD) has been reviewed for the site access location and the Clifton Road / Byculla Road intersection. The review was completed to confirm applicable sight distance requirements in accordance with Austroads requirements.

**Table 6-2** summarises the variables used for the SISD calculation.

**Table 6-2 : Variables adopted for sight distance assessment**

| Variable symbol | Description                                                                                                                              |                             |           | Value adopted for assessment |      | Unit of measure |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------|------------------------------|------|-----------------|
|                 |                                                                                                                                          |                             |           | Truck                        | Car  |                 |
| DT              | Decision time (s) = observation time (3 s) + reaction time (s)                                                                           |                             |           | 5                            | 5    | seconds         |
| V               | Operating (85 <sup>th</sup> percentile) speed                                                                                            |                             |           | 110                          | 110  | km/h            |
| d               | Coefficient of deceleration for cars / trucks ( <i>Guide to Road Design – Part 3: Geometric Design (Austroads 2016)</i> )                |                             |           | 0.29                         | 0.36 |                 |
| a               | Longitudinal grade in % (in direction of travel: positive for uphill grade, negative for downhill grade)                                 | Clifton Road / Byculla Road | Northwest | 4                            | %    |                 |
|                 |                                                                                                                                          |                             | South     | 1                            |      |                 |
| R <sub>T</sub>  | perception/reaction time ( <i>Guide to Road Design – Part 3: Geometric Design (Austroads 2016)</i> )                                     |                             |           | 2.0                          | 2.0  | seconds         |
| SISD            | $SISD = \frac{D_T \times V}{3.6} + \frac{V^2}{254 \times (d + 0.01 \times a)}$ <p>(Equation 2 <i>Guide to Road Design - Part 4a</i>)</p> |                             |           |                              |      |                 |

The outcomes of this review are summarised in **Table 6-3**.

**Table 6-3: Safe intersection sight distance requirements**

| Approach road | Vehicle type | Approach  | Available SISD (m) | Required SISD (m) | Compliance |
|---------------|--------------|-----------|--------------------|-------------------|------------|
| Clifton Road  | Car          | Northwest | > 330m             | 272m              | Compliant  |
|               |              | South     | > 500m             | 282m              | Compliant  |
|               | Truck        | Northwest | > 330m             | 297m              | Compliant  |
|               |              | South     | > 500m             | 312m              | Compliant  |

The review indicates that the sight distance available at the site access location and the Clifton Road / Byculla Road intersection is satisfactory and meets the minimum SISD requirements for both approaches. It should be noted that the above assessment is conservative in that it considers an operating speed of 110km/h however it is expected that vehicles will slow down at the curve, as advised by existing curve warning signage and 60km/h advisory speed.

To further improve sight lines at the intersection, particularly for the northwest approach, it is recommended that 'Give-Way' signage and line marking is installed on the Byculla Road leg set back (i.e. offset) to Clifton Road, as illustrated in **Figure 6-1**.



Figure 6-1: Sight line comparison with and without offset

## 7. Site layout review

Internal gravel access roads and manoeuvring areas are proposed for the development, to provide internal connections between each pod and associated amenity facilities on site. This is considered satisfactory for the required servicing movements of heavy vehicles and low traffic volumes associated with the development.

The proposed layout plan for the development is detailed in **Appendix A**.

### 7.1 Site access review

#### 7.1.1 Access #1: Byculla Road (entry/exit) – all vehicle types

As stated in **Section 2.2.1**, development vehicles will gain access to the site via an existing access on Byculla Road (Access #1). Byculla Road is a 'No Through Road' and the site access is located at the end of the unsealed portion of the road. The access will operate in a one-way arrangement and therefore, it is expected that heavy vehicle movements are timed in such a way that movements do not coincide with one another. This access is an existing access and no constraints or deficiencies have been identified by the client.

#### 7.1.2 Access #2: Clifton Road (exit only) – staff (light) vehicles only

A secondary access (Access #2) is located south of the subject site itself, however still within the greater McLeans facility. This access serves as a staff only exit (i.e. no heavy vehicles). Access #2 is an existing access and from a desktop inspection, sight lines at this intersection are adequate and compliant with SISD requirements.

### 7.2 Car parking review

The TRC Planning Scheme *Transport, Access and Parking Code* stipulates that no parking rate is required for the development (intensive animal industry land use).

Although no parking rate is required by Council, car parking for sites with similar land uses to the development typically involve provision for one car parking space per employee vehicle, with a couple of additional car parking spaces provided for visitors / contractors.

Due to the large site area, it is expected that car parking areas will be available for staff and maintenance contractors.

Due to the size and greenfield nature of the development land, additional informal parking could also be accommodated in the vicinity of the proposed car parking area, as well within other areas of the development, if required.

### 7.3 Swept path assessment

As stated above in **Section 7.1**, the proposed development will utilise the existing access on Byculla Road. The design vehicle for the proposed expansion remains the same as existing operations and no reports or concerns have been raised by the client regarding spatial constraints at the site access.

Furthermore, the internal road network has been designed to cater for the design vehicle of the expansion (19m semi-trailer) as illustrated on the development layout drawings in **Appendix A**.

## 8. Summary and recommendations

RMA Engineers has been engaged by Alpair Pty Ltd to undertake a Traffic Impact Assessment (TIA) in support of a development application for a proposed poultry rearing farm expansion located on the corner of Clifton Road and Byculla Road, North Branch (the subject site). The proposed development site is identified as Lot 1745 on A34901 within the Toowoomba Regional Council (TRC) area.

The proposed development consists of a rearing farm to be constructed on the subject site, which will comprise of five (5) pods (two sheds per pod) and ancillary facilities. Access to the subject site is via an existing access located at the end of Byculla Road.

This report has been prepared in support of the development application for the proposed poultry farm development to be lodged with TRC. This report considers the traffic impacts of the expansion and the ultimate scenario, and is summarised as follows:

### Proposed development

- The proposed expansion consists of five (5) pods (two sheds per pod) and associated ancillary facilities (site amenities).
- The development proposes to construct an additional pod (two sheds) every year until 2029 (ultimate completion), totalling five pods (10 sheds).
- The subject site gains access to/from the external road network via two existing access locations:
  - › Access #1: Byculla Road (entry/exit) – all vehicle types
  - › Access #2: Clifton Road (exit only) – staff (light) vehicles only
- A total of 12 additional full time staff (including contractors) will be employed to carry out the site operations seven days a week. The staff travelling to and from the site will arrive for their shift no later than 6am and leave the site when their shift ends, at approximately 6pm. It is understood that all staff members will travel to and from Pittsworth in private (light) vehicles, with 2 staff per vehicle.
- The proposed expansion will generate relatively low daily traffic volumes, consisting of an average of two heavy vehicles and six light vehicles per day. This equates to a combined average of eight vehicles per day.

### Development impact

- The anticipated 'background with development' traffic volumes do not exceed the hourly volume combinations outlined in the DTMR *Road Planning and Design Manual* Chapter 13.5.4. Therefore, intersection analysis is not deemed warranted for the key intersection or site access location.
- Considering the relatively minor traffic volumes associated with the development and the existing peak hour traffic volumes, it is not expected that there will be any operational or capacity issues on the surrounding external road network as a result of the proposed development.
- Using GTIA methodology, the heavy vehicle impact relating to the operation of the proposed expansion is not expected to have an adverse impact on the external road network pavement. This is because of the minimal number of heavy vehicles (i.e. two per day) and the net increase of SAR4s related to the development is less than 5.0% of the existing background SAR4s on the network.

### **Safety considerations**

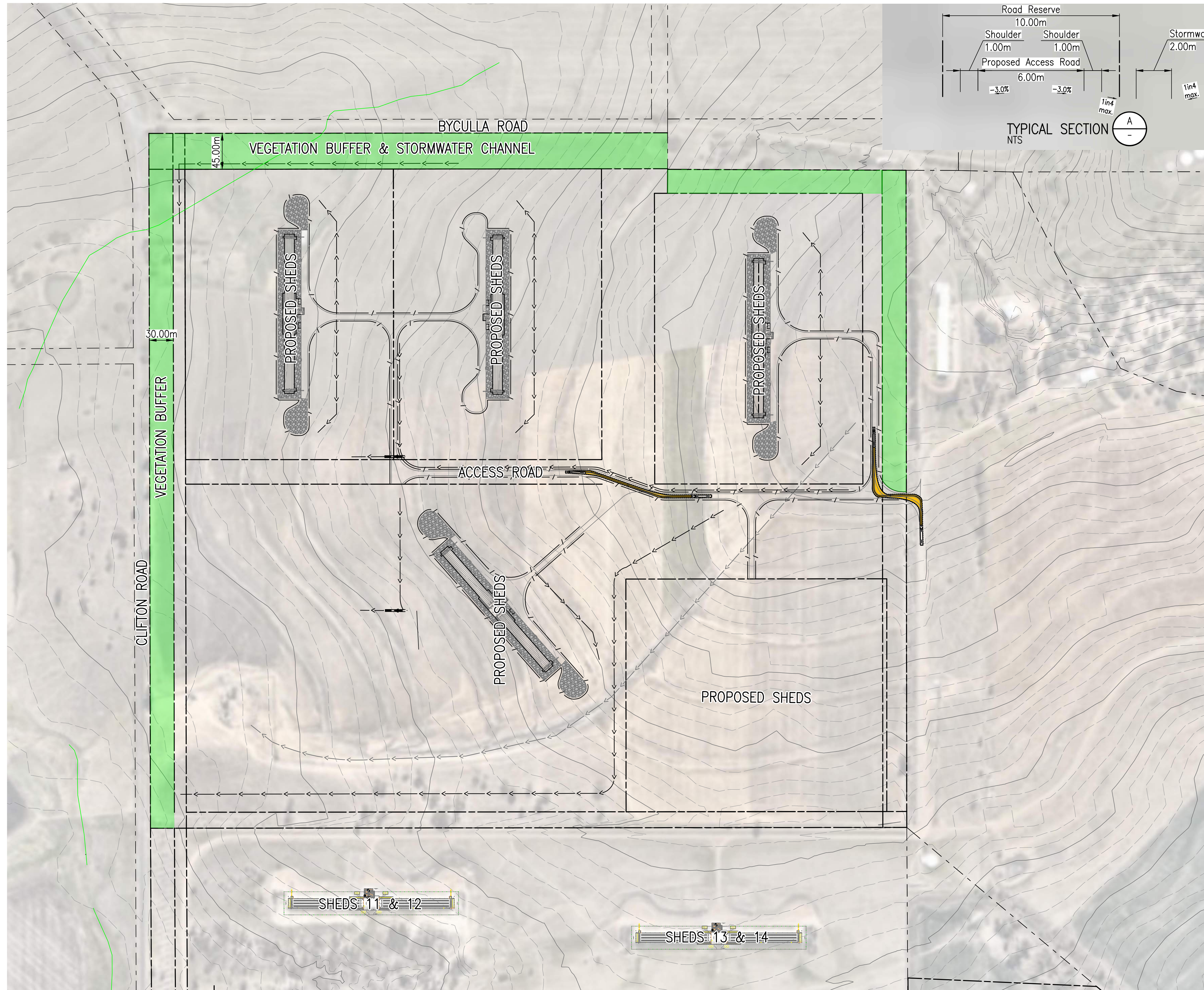
- The turning movements at the Clifton Road / Byculla Road intersection fall within simple right turn and basic left turn (BAL) thresholds. It is noted that the intersection currently features a short auxiliary left turn lane (AUL(s)) and therefore, no further turn treatments or channelisation is triggered by the development.
- The sight distance available at the site access location and the Clifton Road / Byculla Road intersection is satisfactory and meets the minimum SISD requirements for both approaches (110km/hr operating speed).
- To further improve sight lines at the Clifton Road / Byculla Road intersection, particularly for the northwest approach, it is recommended that 'Give-Way' signage and line marking is installed on the Byculla Road leg set back (i.e. offset) to Clifton Road, as illustrated in **Figure 6-1**.

### **Site layout review**

- Due to the large site area, it is expected that car parking areas will be available for staff and maintenance contractors.
- The proposed development will utilise the existing access on Byculla Road. The design vehicle for the proposed expansion remains the same as existing operations and no reports or concerns have been raised by the client regarding spatial constraints at the site access.
- The internal road network has been designed to cater for the design vehicle of the expansion (19m semi-trailer).

With respect to the above findings and recommendations of this TIA report, the proposed development can proceed without any unacceptable or adverse impacts on the external road network. No traffic and transport engineering matters have been identified that should preclude approval of the proposed development at this location.

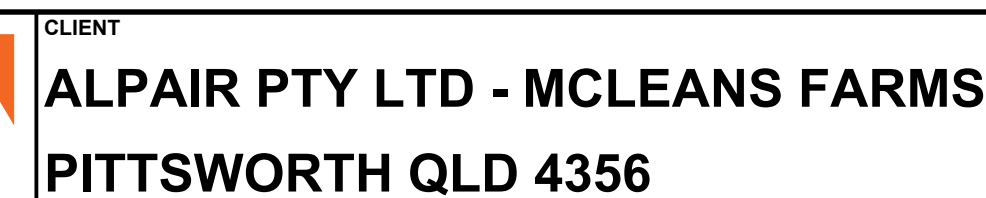
## **Appendix A   Development layout**



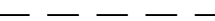
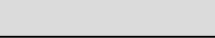
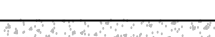
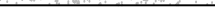
Scale 1:2500 (A1)

R.P.E.Q.

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TITLE  
**CONCEPT LAYOUT PLAN**

|                                                                                     |                                               |
|-------------------------------------------------------------------------------------|-----------------------------------------------|
|  | Existing Property Boundary                    |
|  | Existing Easement Boundary                    |
|  | Existing Road Pavement                        |
|  | Existing Concrete Pavement                    |
|  | Proposed Range Fencing                        |
|  | Stormwater Invert                             |
|  | Existing Stormwater Invert                    |
|  | Waterway Barrier Works<br>(QLD Globe Mapping) |
|  | Proposed Road Gravel Pavement                 |
|  | Design Minor Contours                         |
|  | Design Major Contours                         |

- P.1. This is a sketch plan only and is conceptual only.
- P.2. This sketch plan represents design intent and concepts only.
- P.3. This plan shall not be used for tendering, financing, ordering of materials, construction or any other unintended purpose.
- P.4. Information shown on these plans has been compiled from varying sources and may not be accurate and will need verifying. This includes existing infrastructure, property boundaries and natural surface data.
- P.5. This plan shall not be relied upon for detailed design.

0 25 50 75 100m  
1:2500(A1) 1:5000(A3)

|                            |                           |                   |
|----------------------------|---------------------------|-------------------|
| HEIGHT DATUM<br><b>AHD</b> | MAP GRID<br><b>MGA-56</b> | SIZE<br><b>A1</b> |
| COUNCIL RAL/MCU NO.        |                           |                   |

|                |
|----------------|
| COUNCIL OW NO. |
|----------------|

|                                |                                |                   |
|--------------------------------|--------------------------------|-------------------|
| PROJECT NO.<br><b>22E 0384</b> | DRAWING NO.<br><b>C SK0004</b> | ISSUE<br><b>B</b> |
|--------------------------------|--------------------------------|-------------------|

## **Appendix B    Traffic count data**

## MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)

### VirtWeeklyVehicle-329 -- English (ENA)

#### Datasets:

**Site:** [tc192035165] Clifton Rd btw Boundary Rd & Jentz Rd  
**Attribute:**  
**Direction:** 7 - North bound A>B, South bound B>A. **Lane:** 0  
**Survey Duration:** 15:22 Tuesday, 8 October 2019 => 13:55 Wednesday, 16 October 2019,  
**Zone:**  
**File:** tc192035165 0 2019-10-16 1418.EC0 (Plus )  
**Identifier:** 1838MKD4 MC56-6 [MC55] (c)Microcom 02/03/01  
**Algorithm:** Factory default axle (v5.08)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

#### Profile:

**Filter time:** 15:23 Tuesday, 8 October 2019 => 13:55 Wednesday, 16 October 2019 (7.93904) (With Exclusions)  
**Exclusion:** Vehicles are excluded at the following times:  
 None  
 The following entire days are excluded:  
 Tuesday, 8 October 2019  
 Wednesday, 16 October 2019

**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12  
**Speed range:** 0 - 200 km/h.  
**Direction:** North (bound), P = North, Lane = 0-16  
**Separation:** Headway > 0 sec, Span 0 - 100 metre  
**Name:** Default Profile  
**Scheme:** Vehicle classification (AustRoads94)  
**Units:** Metric (metre, kilometre, m/s, km/h, kg, tonne)  
**In profile:** Vehicles = 1951 / 4405 (44.29%)

## Weekly Vehicle Counts (Virtual Week)

**VirtWeeklyVehicle-329**
**Site:** tc192035165.0.1NS

**Description:** Clifton Rd btw Boundary Rd & Jentz Rd

**Filter time:** 15:23 Tuesday, 8 October 2019 => 13:55 Wednesday, 16 October 2019 (With Exclusions)

**Scheme:** Vehicle classification (AustRoads94)

**Filter:** Cls(1-12) Dir(N) Sp(0,200) Headway(>0) Span(0 - 100) Lane(0-16)

|                | Mon         | Tue         | Wed         | Thu         | Fri         | Sat         | Sun         | Averages    |             |
|----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                |             |             |             |             |             |             |             | 1 - 5       | 1 - 7       |
| <b>Hour</b>    |             |             |             |             |             |             |             |             |             |
| 0000-0100      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 1.0         | 0.0         | 0.1         |
| 0100-0200      | 1.0         | 0.0         | 0.0         | 0.0         | 0.0         | 1.0         | 0.0         | 0.2         | 0.3         |
| 0200-0300      | 1.0         | 2.0         | 3.0         | 1.0         | 1.0         | 2.0         | 1.0         | 1.6         | 1.6         |
| 0300-0400      | 3.0         | 1.0         | 1.0         | 3.0         | 3.0         | 1.0         | 1.0         | 2.2         | 1.9         |
| 0400-0500      | 5.0         | 8.0         | 8.0         | 6.0         | 3.0         | 1.0         | 1.0         | 6.0         | 4.6         |
| 0500-0600      | 13.0        | 12.0        | 10.0        | 8.0         | 13.0        | 4.0         | 6.0         | 11.2        | 9.4         |
| 0600-0700      | 15.0        | 18.0        | 19.0        | 15.0        | 16.0        | 6.0         | 7.0         | 16.6        | 13.7        |
| 0700-0800      | 26.0        | 25.0        | 24.0        | 29.0        | 31.0        | 18.0        | 10.0        | 27.0        | 23.3        |
| 0800-0900      | <b>27.0</b> | <b>30.0</b> | <b>27.0</b> | <b>34.0</b> | <b>35.0</b> | 27.0        | 18.0        | <b>30.6</b> | <b>28.3</b> |
| 0900-1000      | 22.0        | 24.0        | 21.0        | 32.0        | 30.0        | <b>32.0</b> | 19.0        | 25.8        | 25.7        |
| 1000-1100      | 20.0        | 21.0        | 23.0        | 28.0        | 24.0        | 16.0        | <b>19.0</b> | 23.2        | 21.6        |
| 1100-1200      | 13.0        | 15.0        | 20.0        | 16.0        | 17.0        | 21.0        | 16.0        | 16.2        | 16.9        |
| 1200-1300      | 10.0        | 22.0        | 10.0        | 9.0         | 24.0        | 13.0        | 12.0        | 15.0        | 14.3        |
| 1300-1400      | 31.0        | 26.0        | 29.0        | 22.0        | <b>29.0</b> | 12.0        | 12.0        | 27.4        | 23.0        |
| 1400-1500      | <b>33.0</b> | <b>29.0</b> | 27.0        | <b>33.0</b> | 25.0        | <b>17.0</b> | 12.0        | <b>29.4</b> | <b>25.1</b> |
| 1500-1600      | 27.0        | 25.0        | <b>30.0</b> | 27.0        | 21.0        | 10.0        | 9.0         | 26.0        | 21.3        |
| 1600-1700      | 27.0        | 15.0        | 24.0        | 21.0        | 22.0        | 12.0        | 12.0        | 21.8        | 19.0        |
| 1700-1800      | 12.0        | 11.0        | 13.0        | 23.0        | 21.0        | 10.0        | <b>12.0</b> | 16.0        | 14.6        |
| 1800-1900      | 7.0         | 11.0        | 9.0         | 11.0        | 5.0         | 9.0         | 4.0         | 8.6         | 8.0         |
| 1900-2000      | 0.0         | 2.0         | 5.0         | 0.0         | 3.0         | 2.0         | 1.0         | 2.0         | 1.9         |
| 2000-2100      | 2.0         | 2.0         | 3.0         | 0.0         | 2.0         | 1.0         | 2.0         | 1.8         | 1.7         |
| 2100-2200      | 0.0         | 1.0         | 2.0         | 0.0         | 2.0         | 0.0         | 2.0         | 1.0         | 1.0         |
| 2200-2300      | 0.0         | 2.0         | 0.0         | 0.0         | 3.0         | 0.0         | 0.0         | 1.0         | 0.7         |
| 2300-2400      | 2.0         | 1.0         | 1.0         | 0.0         | 1.0         | 1.0         | 0.0         | 1.0         | 0.9         |
| <b>Totals</b>  |             |             |             |             |             |             |             |             |             |
| 0700-1900      | 255.0       | 254.0       | 257.0       | 285.0       | 284.0       | 197.0       | 155.0       | 267.0       | 241.0       |
| 0600-2200      | 272.0       | 277.0       | 286.0       | 300.0       | 307.0       | 206.0       | 167.0       | 288.4       | 259.3       |
| 0600-0000      | 274.0       | 280.0       | 287.0       | 300.0       | 311.0       | 207.0       | 167.0       | 290.4       | 260.9       |
| 0000-0000      | 297.0       | 303.0       | 309.0       | 318.0       | 331.0       | 216.0       | 177.0       | 311.6       | 278.7       |
| <b>AM Peak</b> | 0800        | 0800        | 0800        | 0800        | 0800        | 0900        | 1000        |             |             |
|                | 27.0        | 30.0        | 27.0        | 34.0        | 35.0        | 32.0        | 19.0        |             |             |
| <b>PM Peak</b> | 1400        | 1400        | 1500        | 1400        | 1300        | 1400        | 1700        |             |             |
|                | 33.0        | 29.0        | 30.0        | 33.0        | 29.0        | 17.0        | 12.0        |             |             |

\* - No data.

## MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)

### VirtWeeklyVehicle-330 -- English (ENA)

#### Datasets:

**Site:** [tc192035165] Clifton Rd btw Boundary Rd & Jentz Rd  
**Attribute:**  
**Direction:** 7 - North bound A>B, South bound B>A. **Lane:** 0  
**Survey Duration:** 15:22 Tuesday, 8 October 2019 => 13:55 Wednesday, 16 October 2019,  
**Zone:**  
**File:** tc192035165 0 2019-10-16 1418.EC0 (Plus )  
**Identifier:** 1838MKD4 MC56-6 [MC55] (c)Microcom 02/03/01  
**Algorithm:** Factory default axle (v5.08)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

#### Profile:

**Filter time:** 15:23 Tuesday, 8 October 2019 => 13:55 Wednesday, 16 October 2019 (7.93904) (With Exclusions)  
**Exclusion:** Vehicles are excluded at the following times:  
 None  
 The following entire days are excluded:  
 Tuesday, 8 October 2019  
 Wednesday, 16 October 2019

**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12  
**Speed range:** 0 - 200 km/h.  
**Direction:** South (bound), P = North, Lane = 0-16  
**Separation:** Headway > 0 sec, Span 0 - 100 metre  
**Name:** Default Profile  
**Scheme:** Vehicle classification (AustRoads94)  
**Units:** Metric (metre, kilometre, m/s, km/h, kg, tonne)  
**In profile:** Vehicles = 1987 / 4405 (45.11%)

## Weekly Vehicle Counts (Virtual Week)

**VirtWeeklyVehicle-330**
**Site:** tc192035165.0.1NS

**Description:** Clifton Rd btw Boundary Rd & Jentz Rd

**Filter time:** 15:23 Tuesday, 8 October 2019 => 13:55 Wednesday, 16 October 2019 (With Exclusions)

**Scheme:** Vehicle classification (AustRoads94)

**Filter:** Cls(1-12) Dir(S) Sp(0,200) Headway(>0) Span(0 - 100) Lane(0-16)

|                | Mon         | Tue         | Wed         | Thu         | Fri         | Sat         | Sun         | Averages    |             |
|----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                |             |             |             |             |             |             |             | 1 - 5       | 1 - 7       |
| <b>Hour</b>    |             |             |             |             |             |             |             |             |             |
| 0000-0100      | 0.0         | 1.0         | 0.0         | 0.0         | 1.0         | 0.0         | 0.0         | 0.4         | 0.3         |
| 0100-0200      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         |
| 0200-0300      | 1.0         | 1.0         | 2.0         | 2.0         | 1.0         | 1.0         | 1.0         | 1.4         | 1.3         |
| 0300-0400      | 1.0         | 1.0         | 1.0         | 1.0         | 0.0         | 1.0         | 0.0         | 0.8         | 0.7         |
| 0400-0500      | 7.0         | 10.0        | 6.0         | 12.0        | 7.0         | 1.0         | 8.0         | 8.4         | 7.3         |
| 0500-0600      | 25.0        | 21.0        | <b>26.0</b> | 22.0        | 26.0        | 11.0        | 8.0         | <b>24.0</b> | 19.9        |
| 0600-0700      | 14.0        | 8.0         | 17.0        | 19.0        | 12.0        | 3.0         | 6.0         | 14.0        | 11.3        |
| 0700-0800      | 13.0        | 15.0        | 12.0        | 16.0        | 19.0        | 3.0         | 7.0         | 15.0        | 12.1        |
| 0800-0900      | 25.0        | 22.0        | 18.0        | <b>24.0</b> | 18.0        | 13.0        | 11.0        | 21.4        | 18.7        |
| 0900-1000      | 20.0        | 24.0        | 20.0        | 17.0        | 28.0        | 20.0        | <b>17.0</b> | 21.8        | 20.9        |
| 1000-1100      | 15.0        | <b>25.0</b> | 24.0        | 13.0        | 20.0        | 22.0        | 12.0        | 19.4        | 18.7        |
| 1100-1200      | <b>27.0</b> | 19.0        | 24.0        | 18.0        | <b>28.0</b> | <b>25.0</b> | 16.0        | 23.2        | <b>22.4</b> |
| 1200-1300      | 15.0        | 25.0        | 16.0        | 26.0        | 17.0        | 22.0        | 17.0        | 19.8        | 19.7        |
| 1300-1400      | 22.0        | 21.0        | 22.0        | 24.0        | 21.0        | <b>22.0</b> | <b>23.0</b> | 22.0        | 22.1        |
| 1400-1500      | 29.0        | <b>28.0</b> | 15.0        | 24.0        | 27.0        | 14.0        | 12.0        | 24.6        | 21.3        |
| 1500-1600      | 14.0        | 27.0        | 22.0        | <b>26.0</b> | <b>33.0</b> | 16.0        | 11.0        | 24.4        | 21.3        |
| 1600-1700      | <b>31.0</b> | 27.0        | <b>33.0</b> | 20.0        | 22.0        | 18.0        | 15.0        | <b>26.6</b> | <b>23.7</b> |
| 1700-1800      | 19.0        | 19.0        | 28.0        | 20.0        | 30.0        | 9.0         | 4.0         | 23.2        | 18.4        |
| 1800-1900      | 13.0        | 10.0        | 13.0        | 9.0         | 14.0        | 4.0         | 7.0         | 11.8        | 10.0        |
| 1900-2000      | 7.0         | 3.0         | 3.0         | 6.0         | 5.0         | 4.0         | 5.0         | 4.8         | 4.7         |
| 2000-2100      | 1.0         | 3.0         | 2.0         | 4.0         | 4.0         | 3.0         | 1.0         | 2.8         | 2.6         |
| 2100-2200      | 2.0         | 6.0         | 6.0         | 7.0         | 4.0         | 3.0         | 0.0         | 5.0         | 4.0         |
| 2200-2300      | 1.0         | 1.0         | 0.0         | 0.0         | 5.0         | 1.0         | 0.0         | 1.4         | 1.1         |
| 2300-2400      | 1.0         | 2.0         | 1.0         | 1.0         | 3.0         | 1.0         | 0.0         | 1.6         | 1.3         |
| <b>Totals</b>  |             |             |             |             |             |             |             |             |             |
| 0700-1900      | 243.0       | 262.0       | 247.0       | 237.0       | 277.0       | 188.0       | 152.0       | 253.2       | 229.4       |
| 0600-2200      | 267.0       | 282.0       | 275.0       | 273.0       | 302.0       | 201.0       | 164.0       | 279.8       | 252.0       |
| 0600-0000      | 269.0       | 285.0       | 276.0       | 274.0       | 310.0       | 203.0       | 164.0       | 282.8       | 254.4       |
| 0000-0000      | 303.0       | 319.0       | 311.0       | 311.0       | 345.0       | 217.0       | 181.0       | 317.8       | 283.9       |
| <b>AM Peak</b> | 1100        | 1000        | 0500        | 0800        | 1100        | 1100        | 0900        |             |             |
|                | 27.0        | 25.0        | 26.0        | 24.0        | 28.0        | 25.0        | 17.0        |             |             |
| <b>PM Peak</b> | 1600        | 1400        | 1600        | 1500        | 1500        | 1300        | 1300        |             |             |
|                | 31.0        | 28.0        | 33.0        | 26.0        | 33.0        | 22.0        | 23.0        |             |             |

\* - No data.

## MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)

### VirtWeeklyVehicle-331 -- English (ENA)

#### Datasets:

**Site:** [tc192035165] Clifton Rd btw Boundary Rd & Jentz Rd  
**Attribute:**  
**Direction:** 7 - North bound A>B, South bound B>A. **Lane:** 0  
**Survey Duration:** 15:22 Tuesday, 8 October 2019 => 13:55 Wednesday, 16 October 2019,  
**Zone:**  
**File:** tc192035165 0 2019-10-16 1418.EC0 (Plus )  
**Identifier:** 1838MKD4 MC56-6 [MC55] (c)Microcom 02/03/01  
**Algorithm:** Factory default axle (v5.08)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

#### Profile:

**Filter time:** 15:23 Tuesday, 8 October 2019 => 13:55 Wednesday, 16 October 2019 (7.93904) (With Exclusions)  
**Exclusion:** Vehicles are excluded at the following times:  
 None  
 The following entire days are excluded:  
 Tuesday, 8 October 2019  
 Wednesday, 16 October 2019

**Included classes:** 3, 4, 5, 6, 7, 8, 9, 10, 11, 12  
**Speed range:** 0 - 200 km/h.  
**Direction:** North (bound), P = North, Lane = 0-16  
**Separation:** Headway > 0 sec, Span 0 - 100 metre  
**Name:** Default Profile  
**Scheme:** Vehicle classification (AustRoads94)  
**Units:** Metric (metre, kilometre, m/s, km/h, kg, tonne)  
**In profile:** Vehicles = 243 / 4405 (5.52%)

## Weekly Vehicle Counts (Virtual Week)

**VirtWeeklyVehicle-331**
**Site:** tc192035165.0.1NS

**Description:** Clifton Rd btw Boundary Rd & Jentz Rd

**Filter time:** 15:23 Tuesday, 8 October 2019 => 13:55 Wednesday, 16 October 2019 (With Exclusions)

**Scheme:** Vehicle classification (AustRoads94)

**Filter:** Cls(3-12) Dir(N) Sp(0,200) Headway(>0) Span(0 - 100) Lane(0-16)

|                | Mon  | Tue  | Wed  | Thu  | Fri  | Sat  | Sun  | Averages |       |
|----------------|------|------|------|------|------|------|------|----------|-------|
|                |      |      |      |      |      |      |      | 1 - 5    | 1 - 7 |
| <b>Hour</b>    |      |      |      |      |      |      |      |          |       |
| 0000-0100      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0      | 0.0   |
| 0100-0200      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0      | 0.0   |
| 0200-0300      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0      | 0.0   |
| 0300-0400      | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.2      | 0.1   |
| 0400-0500      | 0.0  | 0.0  | 2.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.4      | 0.3   |
| 0500-0600      | 1.0  | 1.0  | 0.0  | 1.0  | 2.0  | 0.0  | 1.0  | 1.0      | 0.9   |
| 0600-0700      | 0.0  | 1.0  | 2.0  | 1.0  | 3.0  | 2.0  | 0.0  | 1.4      | 1.3   |
| 0700-0800      | 3.0  | 1.0  | 1.0  | 4.0  | 8.0  | 2.0  | 0.0  | 3.4      | 2.7   |
| 0800-0900      | 4.0  | 2.0  | 4.0  | 3.0  | 7.0  | 1.0  | 1.0  | 4.0      | 3.1   |
| 0900-1000      | 5.0  | 6.0  | 5.0  | 3.0  | 8.0  | 1.0  | 2.0  | 5.4      | 4.3   |
| 1000-1100      | 2.0  | 4.0  | 7.0  | 8.0  | 7.0  | 1.0  | 2.0  | 5.6      | 4.4   |
| 1100-1200      | 2.0  | 5.0  | 6.0  | 2.0  | 5.0  | 0.0  | 1.0  | 4.0      | 3.0   |
| 1200-1300      | 3.0  | 5.0  | 2.0  | 1.0  | 7.0  | 0.0  | 1.0  | 3.6      | 2.7   |
| 1300-1400      | 2.0  | 5.0  | 3.0  | 4.0  | 6.0  | 0.0  | 0.0  | 4.0      | 2.9   |
| 1400-1500      | 5.0  | 3.0  | 2.0  | 4.0  | 2.0  | 0.0  | 0.0  | 3.2      | 2.3   |
| 1500-1600      | 4.0  | 4.0  | 5.0  | 2.0  | 1.0  | 0.0  | 0.0  | 3.2      | 2.3   |
| 1600-1700      | 2.0  | 0.0  | 2.0  | 3.0  | 3.0  | 0.0  | 2.0  | 2.0      | 1.7   |
| 1700-1800      | 1.0  | 0.0  | 0.0  | 3.0  | 3.0  | 0.0  | 0.0  | 1.4      | 1.0   |
| 1800-1900      | 2.0  | 1.0  | 2.0  | 2.0  | 1.0  | 0.0  | 0.0  | 1.6      | 1.1   |
| 1900-2000      | 0.0  | 0.0  | 0.0  | 0.0  | 1.0  | 0.0  | 0.0  | 0.2      | 0.1   |
| 2000-2100      | 0.0  | 0.0  | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.2      | 0.1   |
| 2100-2200      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 1.0  | 0.0      | 0.1   |
| 2200-2300      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0      | 0.0   |
| 2300-2400      | 0.0  | 0.0  | 0.0  | 0.0  | 1.0  | 0.0  | 0.0  | 0.2      | 0.1   |
| <b>Totals</b>  |      |      |      |      |      |      |      |          |       |
| 0700-1900      | 35.0 | 36.0 | 39.0 | 39.0 | 58.0 | 5.0  | 9.0  | 41.4     | 31.6  |
| 0600-2200      | 35.0 | 37.0 | 42.0 | 40.0 | 62.0 | 7.0  | 10.0 | 43.2     | 33.3  |
| 0600-0000      | 35.0 | 37.0 | 42.0 | 40.0 | 63.0 | 7.0  | 10.0 | 43.4     | 33.4  |
| 0000-0000      | 37.0 | 38.0 | 44.0 | 41.0 | 65.0 | 7.0  | 11.0 | 45.0     | 34.7  |
| <b>AM Peak</b> | 0900 | 0900 | 1000 | 1000 | 0900 | 0700 | 1000 |          |       |
|                | 5.0  | 6.0  | 7.0  | 8.0  | 8.0  | 2.0  | 2.0  |          |       |
| <b>PM Peak</b> | 1400 | 1300 | 1500 | 1400 | 1200 | 2300 | 1600 |          |       |
|                | 5.0  | 5.0  | 5.0  | 4.0  | 7.0  | 0.0  | 2.0  |          |       |

\* - No data.

## MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)

### VirtWeeklyVehicle-332 -- English (ENA)

#### Datasets:

**Site:** [tc192035165] Clifton Rd btw Boundary Rd & Jentz Rd  
**Attribute:**  
**Direction:** 7 - North bound A>B, South bound B>A. **Lane:** 0  
**Survey Duration:** 15:22 Tuesday, 8 October 2019 => 13:55 Wednesday, 16 October 2019,  
**Zone:**  
**File:** tc192035165 0 2019-10-16 1418.EC0 (Plus )  
**Identifier:** 1838MKD4 MC56-6 [MC55] (c)Microcom 02/03/01  
**Algorithm:** Factory default axle (v5.08)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

#### Profile:

**Filter time:** 15:23 Tuesday, 8 October 2019 => 13:55 Wednesday, 16 October 2019 (7.93904) (With Exclusions)  
**Exclusion:** Vehicles are excluded at the following times:  
 None  
 The following entire days are excluded:  
 Tuesday, 8 October 2019  
 Wednesday, 16 October 2019

**Included classes:** 3, 4, 5, 6, 7, 8, 9, 10, 11, 12  
**Speed range:** 0 - 200 km/h.  
**Direction:** South (bound), P = North, Lane = 0-16  
**Separation:** Headway > 0 sec, Span 0 - 100 metre  
**Name:** Default Profile  
**Scheme:** Vehicle classification (AustRoads94)  
**Units:** Metric (metre, kilometre, m/s, km/h, kg, tonne)  
**In profile:** Vehicles = 250 / 4405 (5.68%)

## Weekly Vehicle Counts (Virtual Week)

**VirtWeeklyVehicle-332**
**Site:** tc192035165.0.1NS

**Description:** Clifton Rd btw Boundary Rd & Jentz Rd

**Filter time:** 15:23 Tuesday, 8 October 2019 => 13:55 Wednesday, 16 October 2019 (With Exclusions)

**Scheme:** Vehicle classification (AustRoads94)

**Filter:** Cls(3-12) Dir(S) Sp(0,200) Headway(>0) Span(0 - 100) Lane(0-16)

|                | Mon  | Tue  | Wed  | Thu  | Fri  | Sat  | Sun  | Averages |       |
|----------------|------|------|------|------|------|------|------|----------|-------|
|                |      |      |      |      |      |      |      | 1 - 5    | 1 - 7 |
| <b>Hour</b>    |      |      |      |      |      |      |      |          |       |
| 0000-0100      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0      | 0.0   |
| 0100-0200      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0      | 0.0   |
| 0200-0300      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0      | 0.0   |
| 0300-0400      | 0.0  | 0.0  | 1.0  | 1.0  | 0.0  | 0.0  | 0.0  | 0.4      | 0.3   |
| 0400-0500      | 0.0  | 1.0  | 1.0  | 1.0  | 1.0  | 0.0  | 1.0  | 0.8      | 0.7   |
| 0500-0600      | 5.0  | 2.0  | 0.0  | 3.0  | 2.0  | 1.0  | 0.0  | 2.4      | 1.9   |
| 0600-0700      | 3.0  | 1.0  | 4.0  | 7.0  | 2.0  | 0.0  | 1.0  | 3.4      | 2.6   |
| 0700-0800      | 0.0  | 3.0  | 0.0  | 3.0  | 8.0  | 0.0  | 1.0  | 2.8      | 2.1   |
| 0800-0900      | 0.0  | 3.0  | 3.0  | 4.0  | 6.0  | 0.0  | 1.0  | 3.2      | 2.4   |
| 0900-1000      | 4.0  | 7.0  | 2.0  | 2.0  | 8.0  | 2.0  | 2.0  | 4.6      | 3.9   |
| 1000-1100      | 2.0  | 5.0  | 6.0  | 3.0  | 2.0  | 0.0  | 0.0  | 3.6      | 2.6   |
| 1100-1200      | 5.0  | 3.0  | 7.0  | 2.0  | 7.0  | 1.0  | 2.0  | 4.8      | 3.9   |
| 1200-1300      | 3.0  | 0.0  | 1.0  | 7.0  | 5.0  | 2.0  | 1.0  | 3.2      | 2.7   |
| 1300-1400      | 6.0  | 5.0  | 3.0  | 4.0  | 4.0  | 1.0  | 1.0  | 4.4      | 3.4   |
| 1400-1500      | 6.0  | 4.0  | 3.0  | 3.0  | 1.0  | 1.0  | 0.0  | 3.4      | 2.6   |
| 1500-1600      | 2.0  | 2.0  | 0.0  | 4.0  | 4.0  | 0.0  | 0.0  | 2.4      | 1.7   |
| 1600-1700      | 1.0  | 4.0  | 7.0  | 2.0  | 1.0  | 0.0  | 1.0  | 3.0      | 2.3   |
| 1700-1800      | 3.0  | 1.0  | 1.0  | 1.0  | 3.0  | 0.0  | 1.0  | 1.8      | 1.4   |
| 1800-1900      | 1.0  | 0.0  | 1.0  | 1.0  | 1.0  | 0.0  | 1.0  | 0.8      | 0.7   |
| 1900-2000      | 0.0  | 0.0  | 0.0  | 0.0  | 2.0  | 0.0  | 0.0  | 0.4      | 0.3   |
| 2000-2100      | 0.0  | 0.0  | 0.0  | 0.0  | 1.0  | 0.0  | 0.0  | 0.2      | 0.1   |
| 2100-2200      | 0.0  | 0.0  | 0.0  | 1.0  | 0.0  | 0.0  | 0.0  | 0.2      | 0.1   |
| 2200-2300      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0      | 0.0   |
| 2300-2400      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0      | 0.0   |
| <b>Totals</b>  |      |      |      |      |      |      |      |          |       |
| 0700-1900      | 33.0 | 37.0 | 34.0 | 36.0 | 50.0 | 7.0  | 11.0 | 38.0     | 29.7  |
| 0600-2200      | 36.0 | 38.0 | 38.0 | 44.0 | 55.0 | 7.0  | 12.0 | 42.2     | 32.9  |
| 0600-0000      | 36.0 | 38.0 | 38.0 | 44.0 | 55.0 | 7.0  | 12.0 | 42.2     | 32.9  |
| 0000-0000      | 41.0 | 41.0 | 40.0 | 49.0 | 58.0 | 8.0  | 13.0 | 45.8     | 35.7  |
| <b>AM Peak</b> | 1100 | 0900 | 1100 | 0600 | 0900 | 0900 | 1100 |          |       |
|                | 5.0  | 7.0  | 7.0  | 7.0  | 8.0  | 2.0  | 2.0  |          |       |
| <b>PM Peak</b> | 1400 | 1300 | 1600 | 1200 | 1200 | 1200 | 1800 |          |       |
|                | 6.0  | 5.0  | 7.0  | 7.0  | 5.0  | 2.0  | 1.0  |          |       |

\* - No data.

## **Appendix C   Turn warrant assessment**

# WARRANTS FOR TURN TREATMENTS

PROJECT: 23E-0384 Byculla Farm Expansion

TITLE: 2029 PEAK HOUR TRAFFIC VOLUMES



## INTERSECTION DETAILS

|                               |            |                        |
|-------------------------------|------------|------------------------|
| Major Road                    |            | Clifton Road           |
| Side Road                     |            | Byculla Road           |
| Splitter Island on Major Road | Yes or No  | No                     |
| Design Domain                 | NDD or EDD | EDD                    |
| Major Road Design Speed       | (km/h)     | More than/equal to 100 |

| TRAFFIC VOLUMES (Vehicles/Hour)             |          |  | BG |    | BG+DEV |    |
|---------------------------------------------|----------|--|----|----|--------|----|
|                                             |          |  | AM | PM | AM     | PM |
| Major Road approaching through traffic flow | $Q_{T1}$ |  | 13 | 10 | 13     | 10 |
| Major Road opposing through traffic flow    | $Q_{T2}$ |  | 28 | 14 | 28     | 14 |
| Right turn traffic flow                     | $Q_R$    |  | 0  | 0  | 0      | 0  |
| Left turn traffic flow                      | $Q_L$    |  | 11 | 0  | 17     | 0  |
| Major Road traffic volume for right turn    | $Q_M$    |  | 52 | 24 | 58     | 24 |
| Major Road traffic volume for left turn     | $Q_M$    |  | 28 | 14 | 28     | 14 |

Turn Warrant Graph (as adapted from Section A.10 TMR RPDM Supplement to AGRD Part 4A 2021)

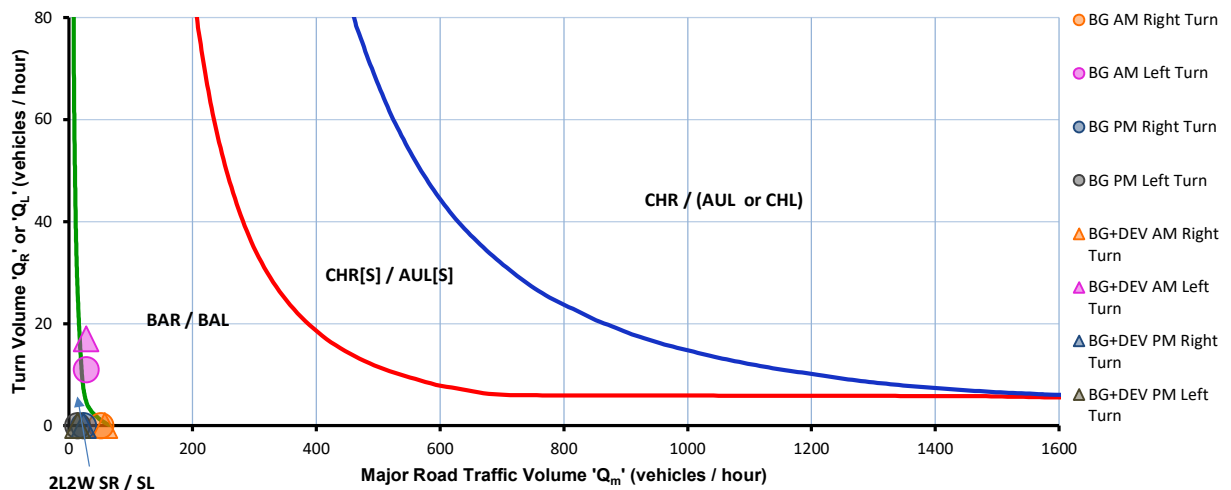
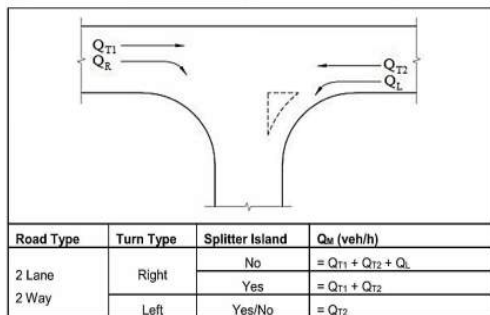


Figure 4A-A 4 - Calculation of the major road traffic volume parameter 'Q\_M'



## RESULTS:

| BG                   |    |                     |     |
|----------------------|----|---------------------|-----|
| Right turn treatment |    | Left turn treatment |     |
| AM                   | SR |                     | BAL |
| PM                   | SR |                     | SL  |
| BG+DEV               |    |                     |     |
| Right turn treatment |    | Left turn treatment |     |
| AM                   | SR |                     | BAL |
| PM                   | SR |                     | SL  |

## NOTES: